FIG. 1(a)

FIG. 1(b)

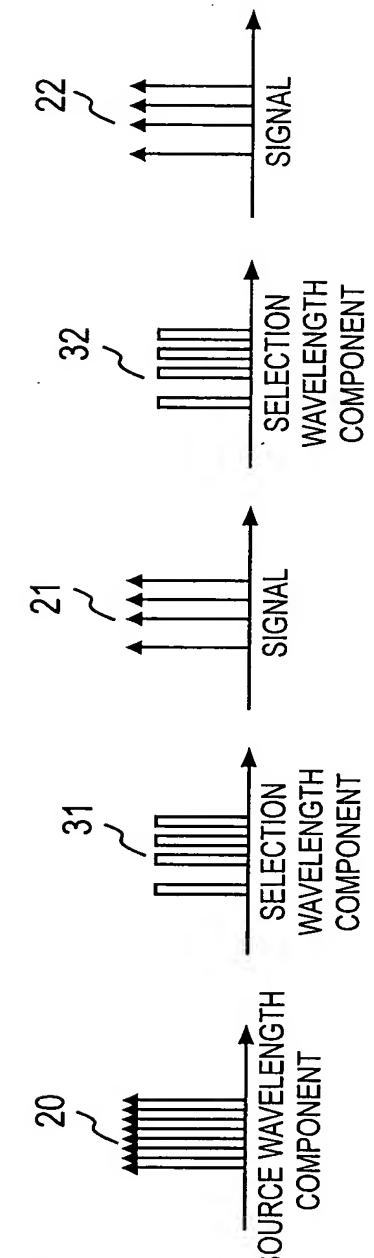


FIG. 1(c)

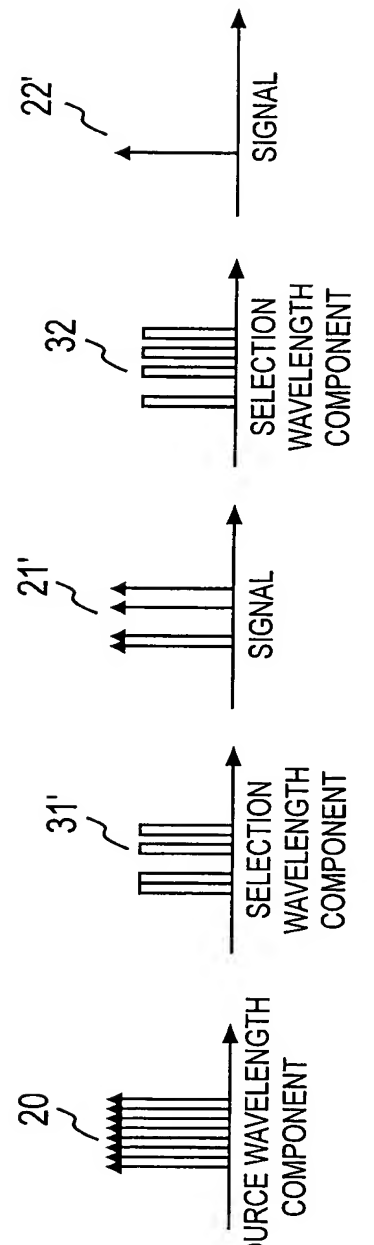


FIG. 2(a)

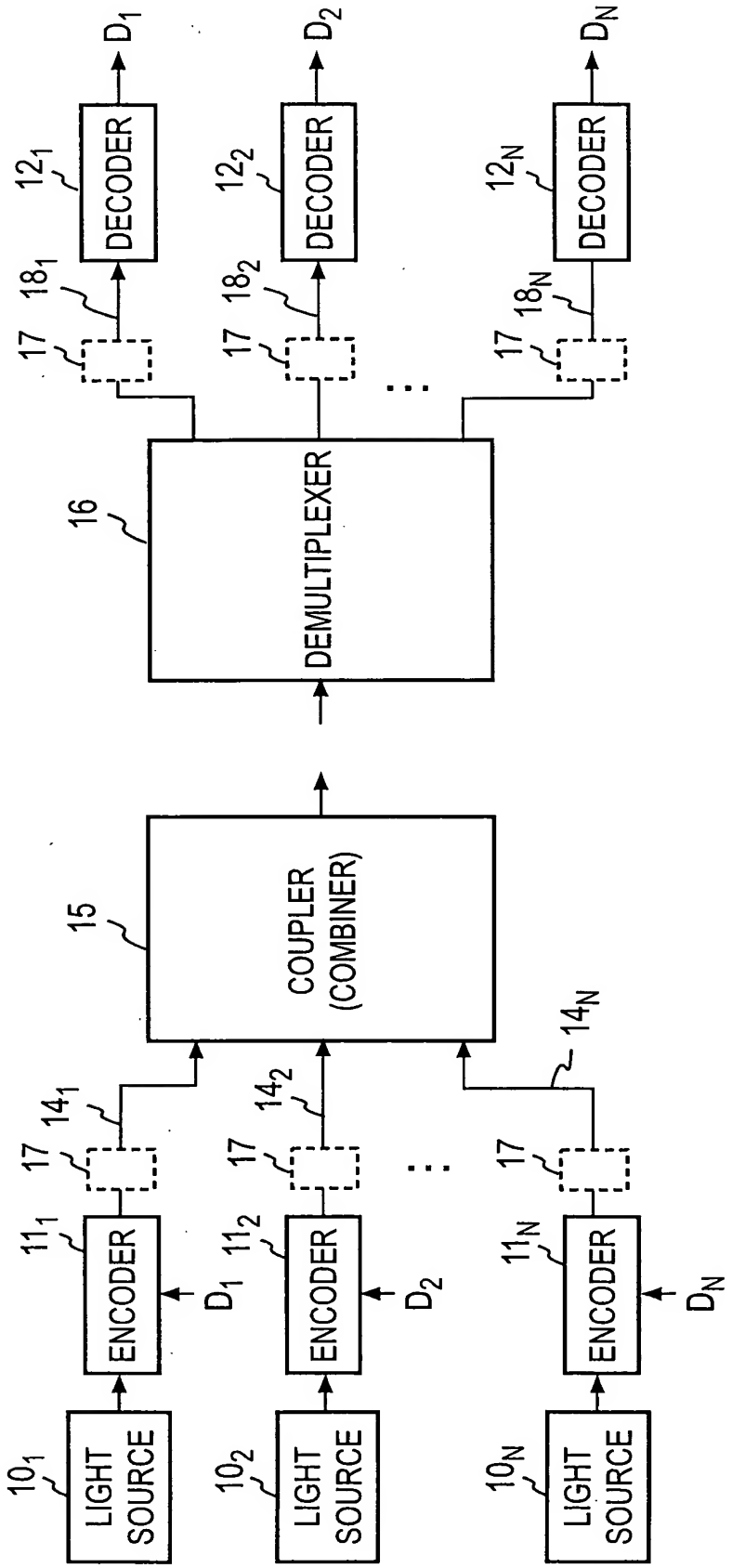

LIGHT SOURCE
10_1
10_2
10_N
ENCODER
11_1
11_2
11_N
D_1
D_2
D_N
17
14_1
14_2
14_N
15
COUPLER (COMBINER)

FIG. 2(b)

16
DEMULTIPLEXER
17
18_1
18_2
18_N
DECODER
12_1
12_2
12_N
D_1
D_2
D_N

FIG. 3(b)

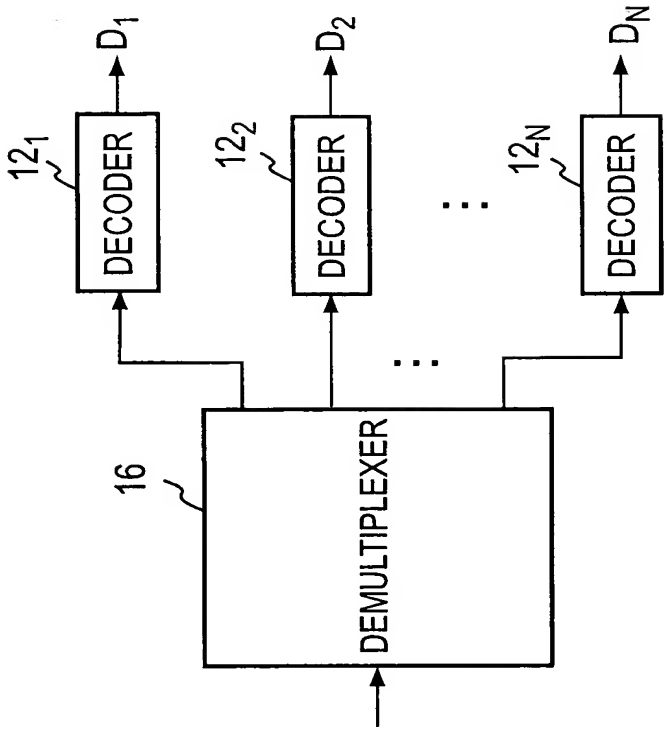

D_1
D_2
D_N
12_1
12_2
12_N
DECODER
DECODER
DECODER
16
DEMULTIPLEXER

FIG. 3(a)

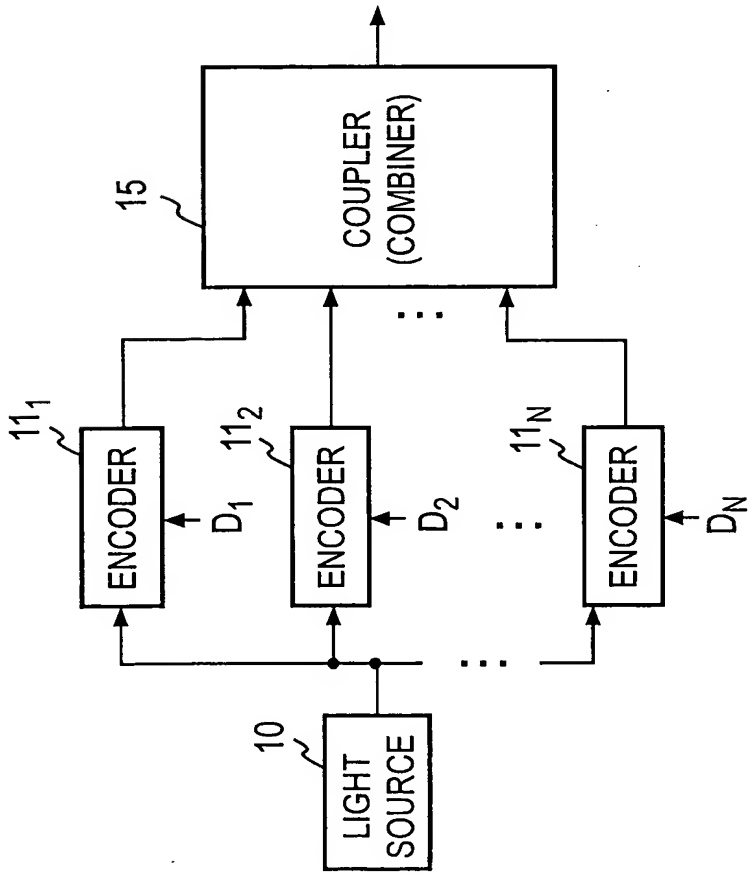

15
COUPLER (COMBINER)
11_1
11_2
11_N
ENCODER
ENCODER
ENCODER
D_1
D_2
D_N
10
LIGHT SOURCE

FIG. 4

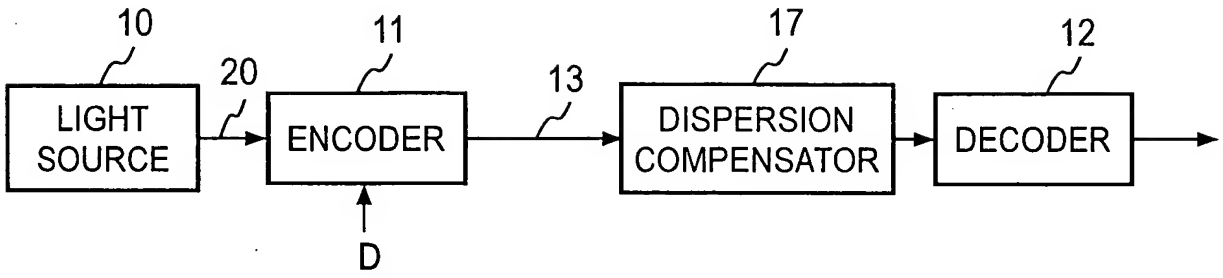


FIG. 5(a)

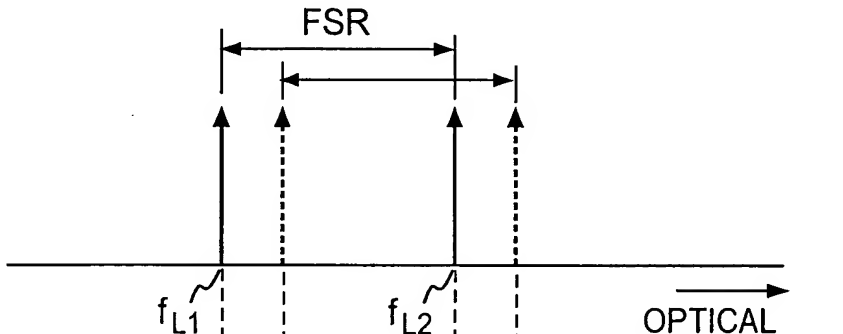


FIG. 5(b)

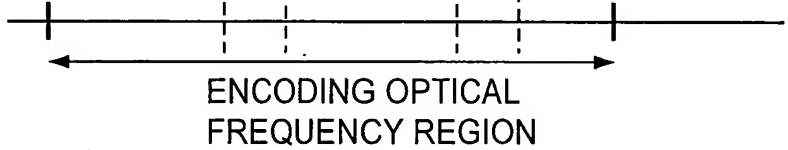


FIG. 5(c)

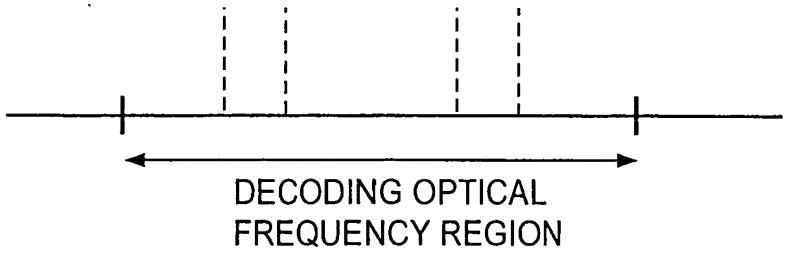


FIG. 6(a)

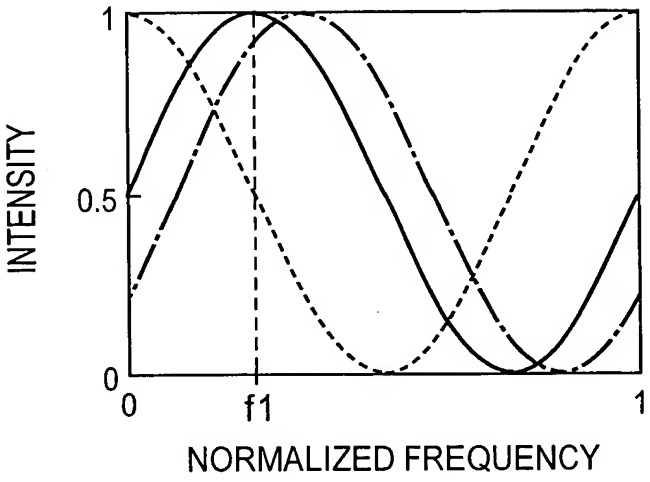


FIG. 6(b)

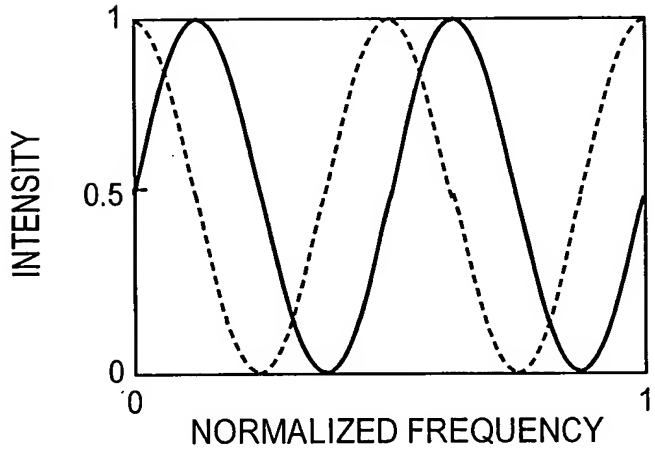


FIG. 6(c)

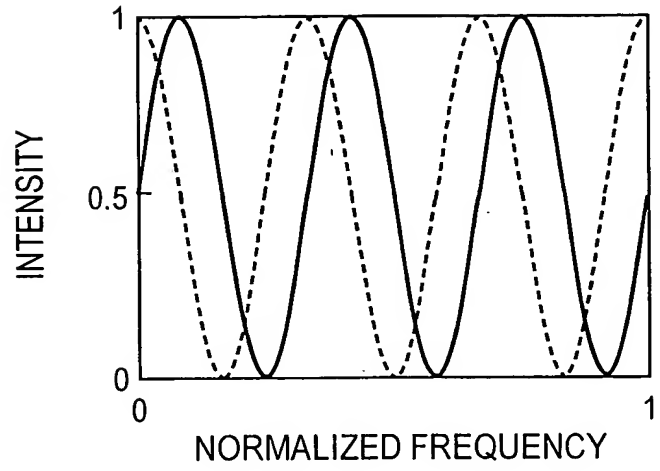


FIG. 7

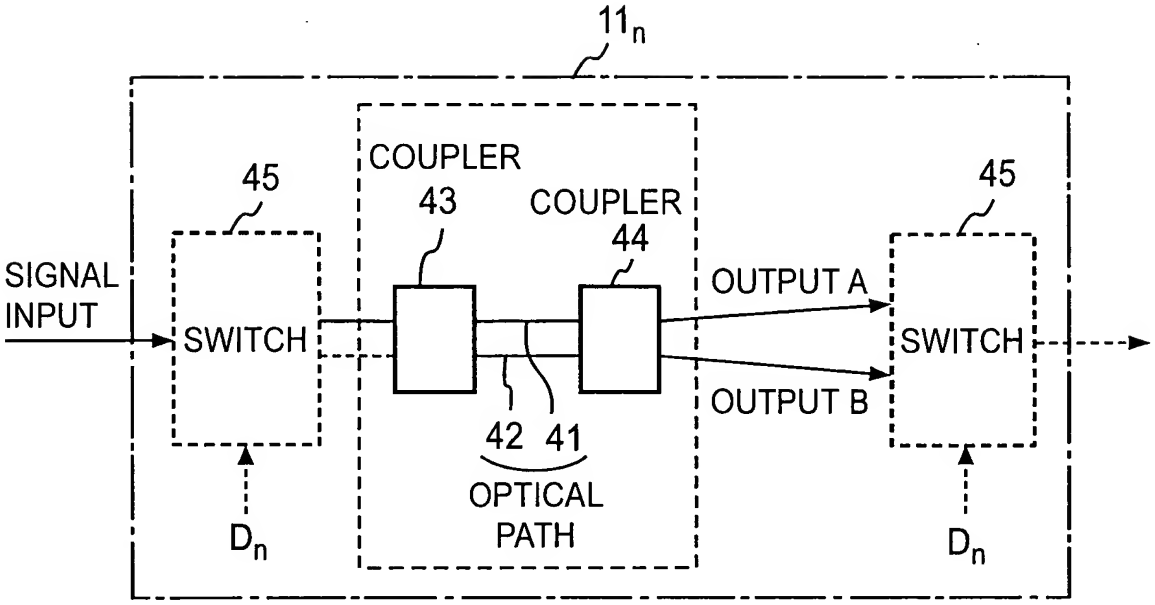

11_n
COUPLER
43
COUPLER
44
45
45
SIGNAL
INPUT
SWITCH
OUTPUT A
OUTPUT B
SWITCH
42 41
OPTICAL
PATH
D_n
D_n

FIG. 8

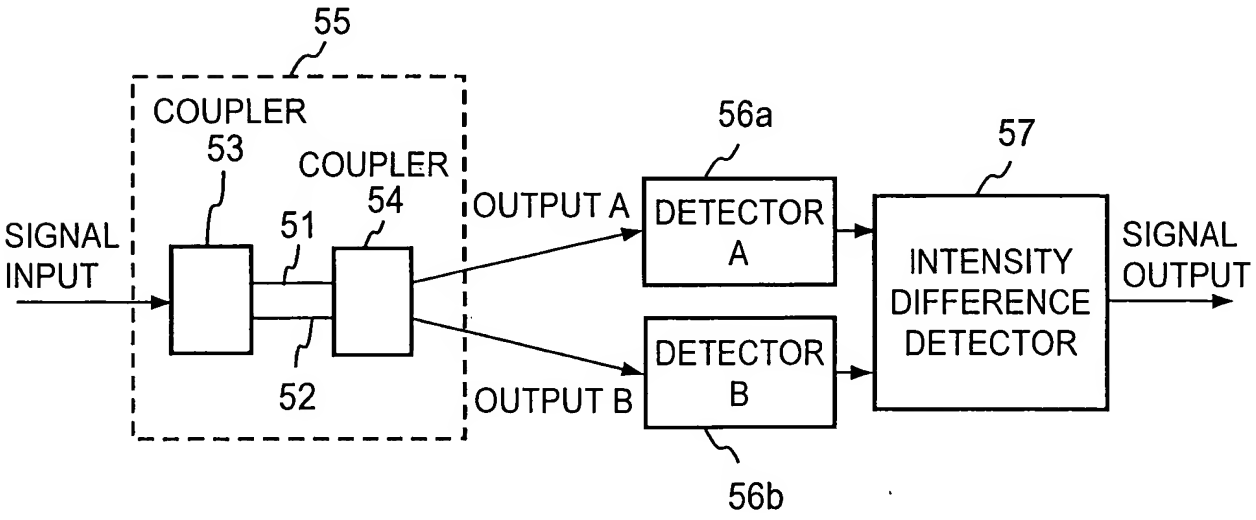

55
COUPLER
53
COUPLER
54
51
52
SIGNAL
INPUT
OUTPUT A
OUTPUT B
56a
DETECTOR
A
DETECTOR
B
56b
57
INTENSITY
DIFFERENCE
DETECTOR
SIGNAL
OUTPUT

FIG. 9

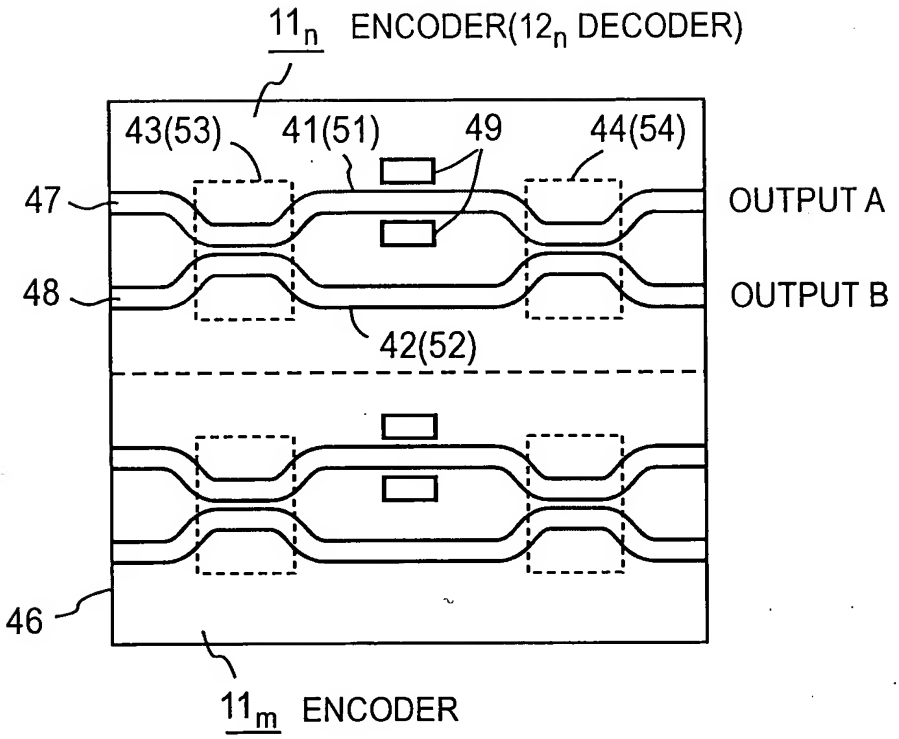


FIG. 10(a)

$$H_1 = \begin{pmatrix} 0 & 0 \\ 0 & 1 \end{pmatrix}$$

FIG. 10(b)

$$H_2 = \begin{pmatrix} H_1 & H_1 \\ H_1 & \overline{H_1} \end{pmatrix} = \begin{pmatrix} 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 1 \\ 0 & 0 & 1 & 1 \\ 0 & 1 & 1 & 0 \end{pmatrix}$$

FIG. 10(c)

$$H_n = \begin{pmatrix} H_{n-1} & H_{n-1} \\ H_{n-1} & \overline{H_{n-1}} \end{pmatrix} \quad (n>1)$$

FIG. 11(a)

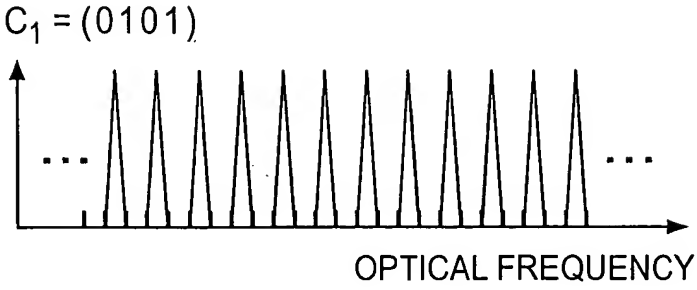


FIG. 11(b)

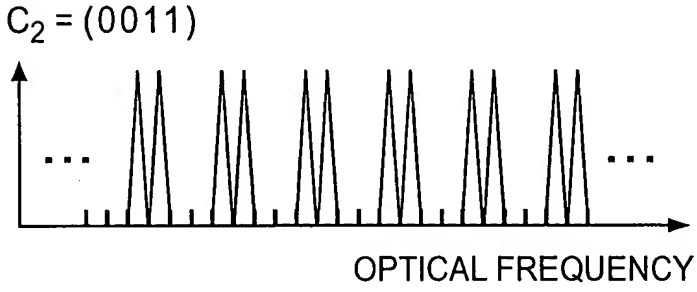
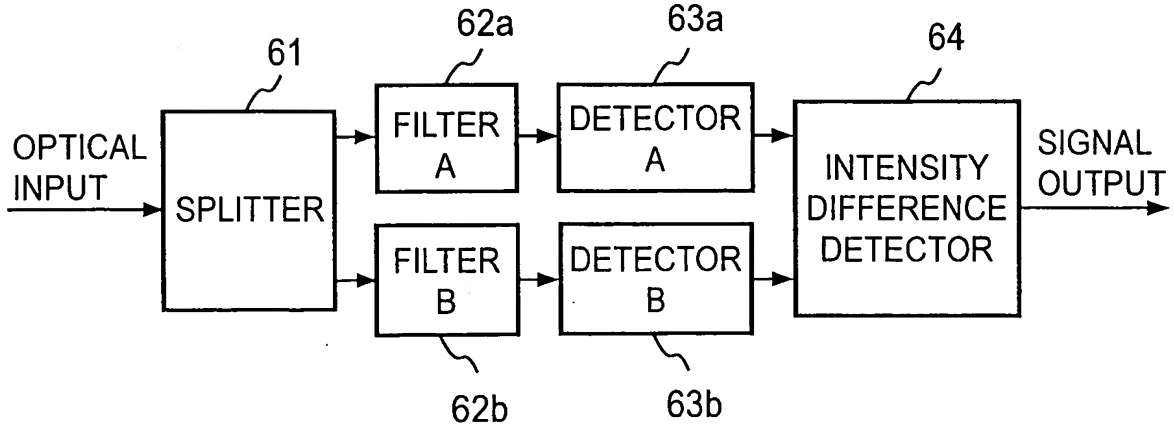


FIG. 12



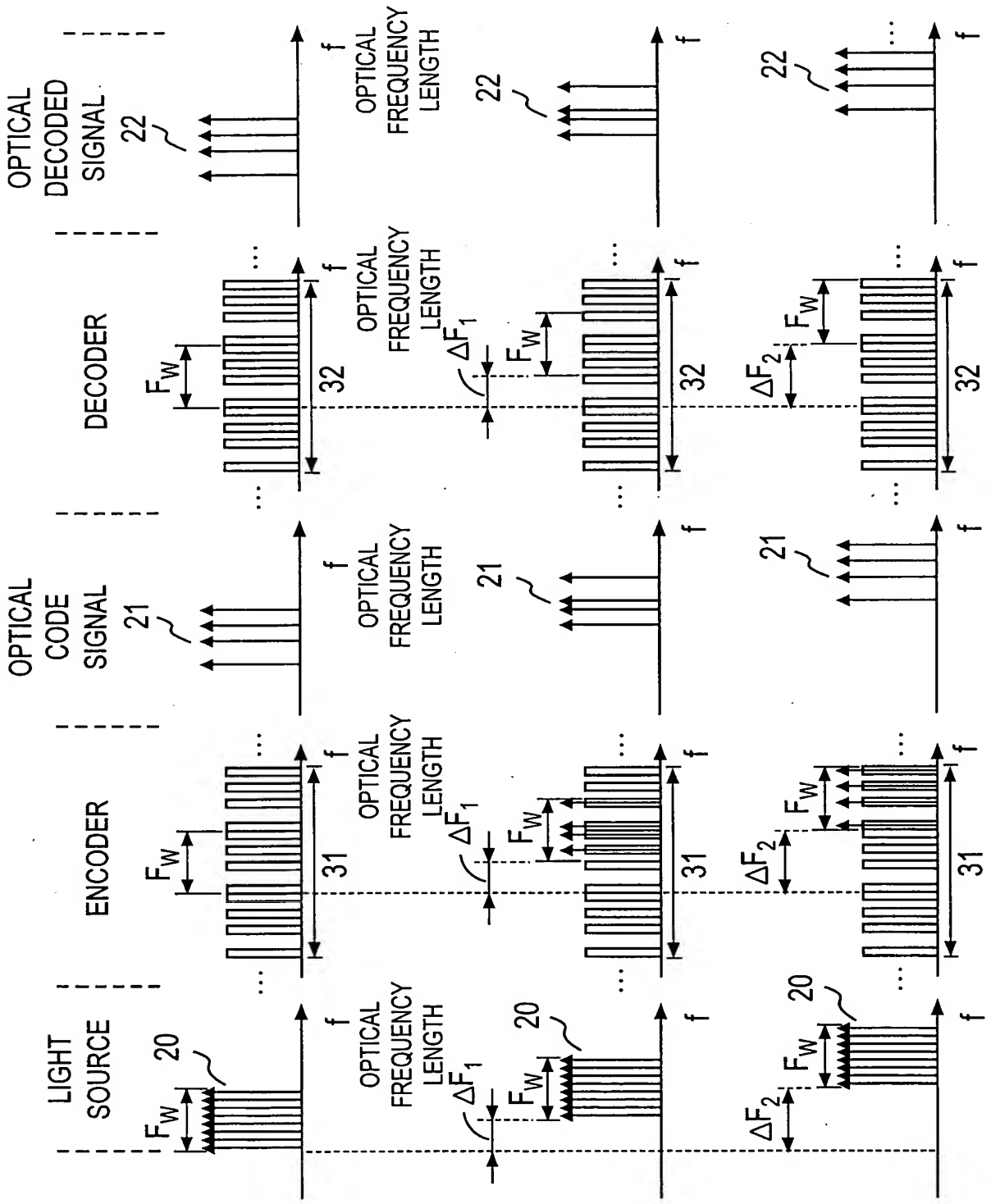


FIG. 13(a)

FIG. 13(b)

FIG. 13(c)

FIG. 14

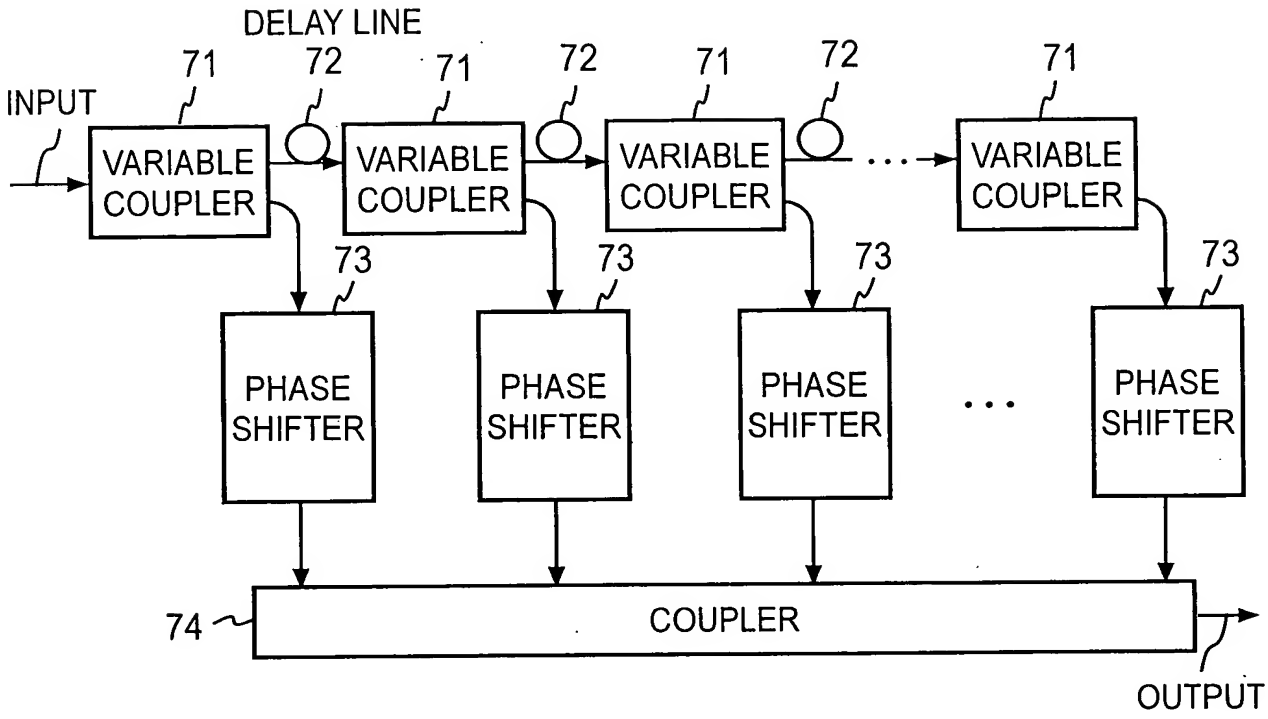

DELAY LINE
INPUT
71
72
71
72
71
72
71
VARIABLE COUPLER
VARIABLE COUPLER
VARIABLE COUPLER
VARIABLE COUPLER
73
73
73
73
PHASE SHIFTER
PHASE SHIFTER
PHASE SHIFTER
PHASE SHIFTER
74
COUPLER
OUTPUT

FIG. 15

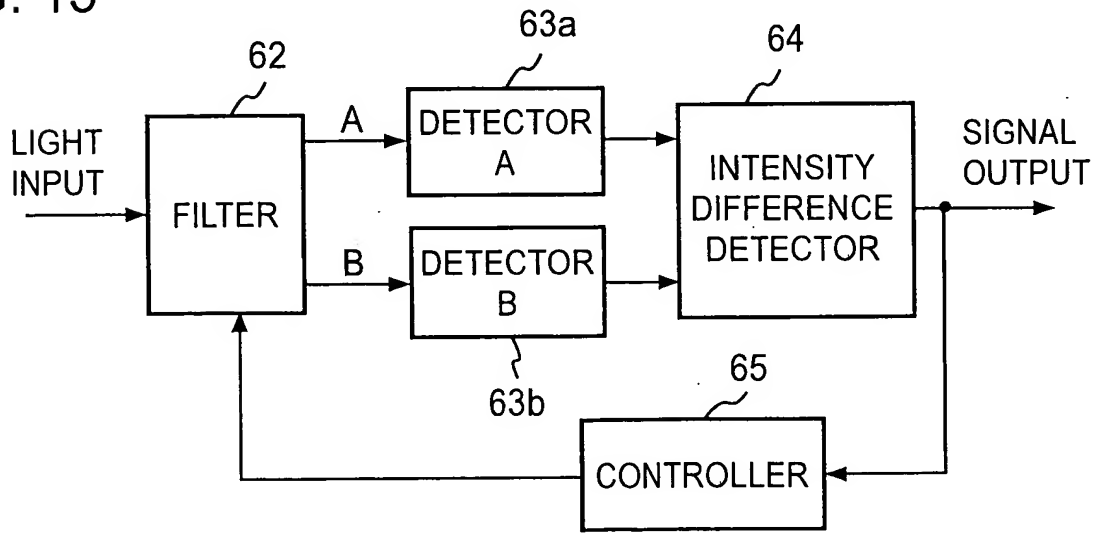

62
63a
64
LIGHT INPUT
FILTER
A
B
DETECTOR A
DETECTOR B
INTENSITY DIFFERENCE DETECTOR
SIGNAL OUTPUT
63b
65
CONTROLLER

FIG. 16

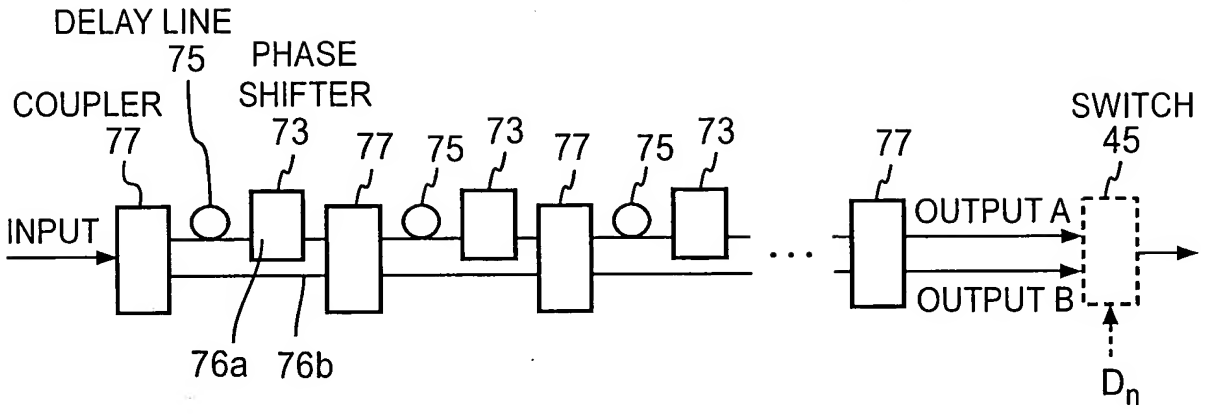

DELAY LINE
75
PHASE
SHIFTER
COUPLER
77
73
77
75
73
77
75
73
77
SWITCH
45
INPUT
OUTPUT A
OUTPUT B
76a
76b
D_n

FIG. 17

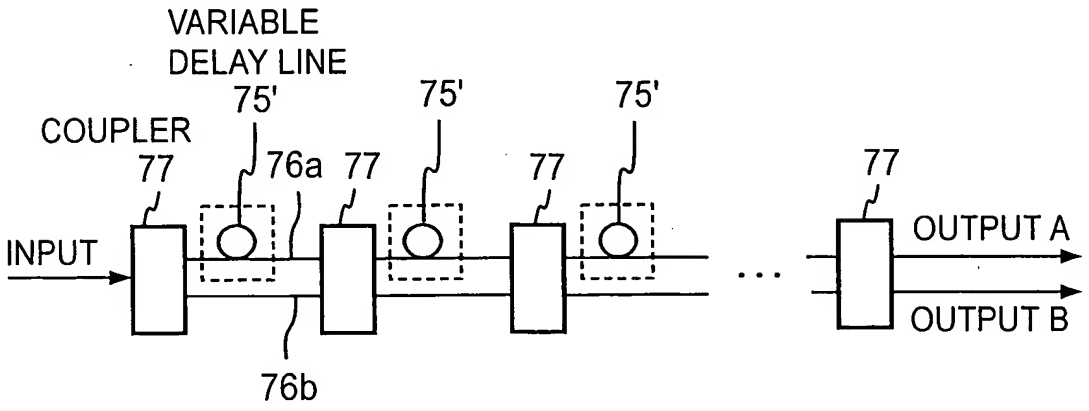

VARIABLE
DELAY LINE
75'
75'
75'
COUPLER
77
76a
77
77
77
INPUT
OUTPUT A
OUTPUT B
76b

FIG. 18

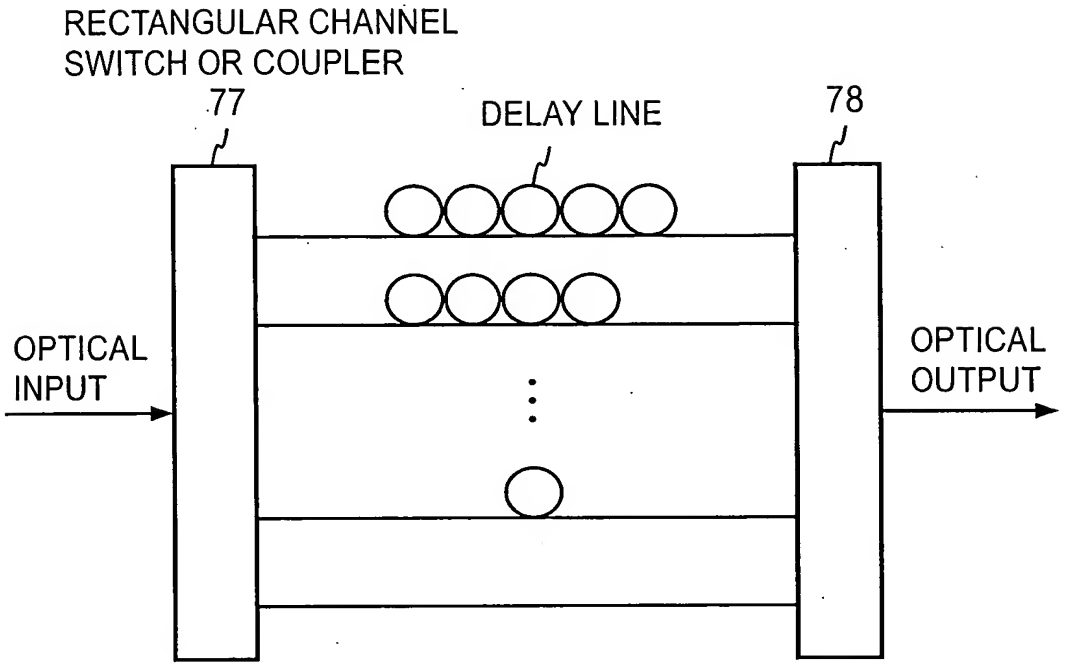
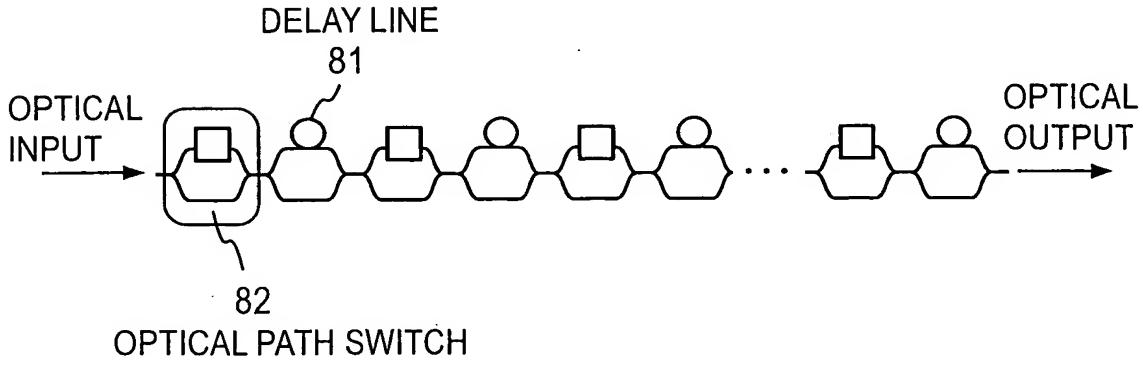

RECTANGULAR CHANNEL
SWITCH OR COUPLER
77
DELAY LINE
78
OPTICAL
INPUT
OPTICAL
OUTPUT

FIG. 19


DELAY LINE
81
OPTICAL
INPUT
OPTICAL
OUTPUT
82
OPTICAL PATH SWITCH

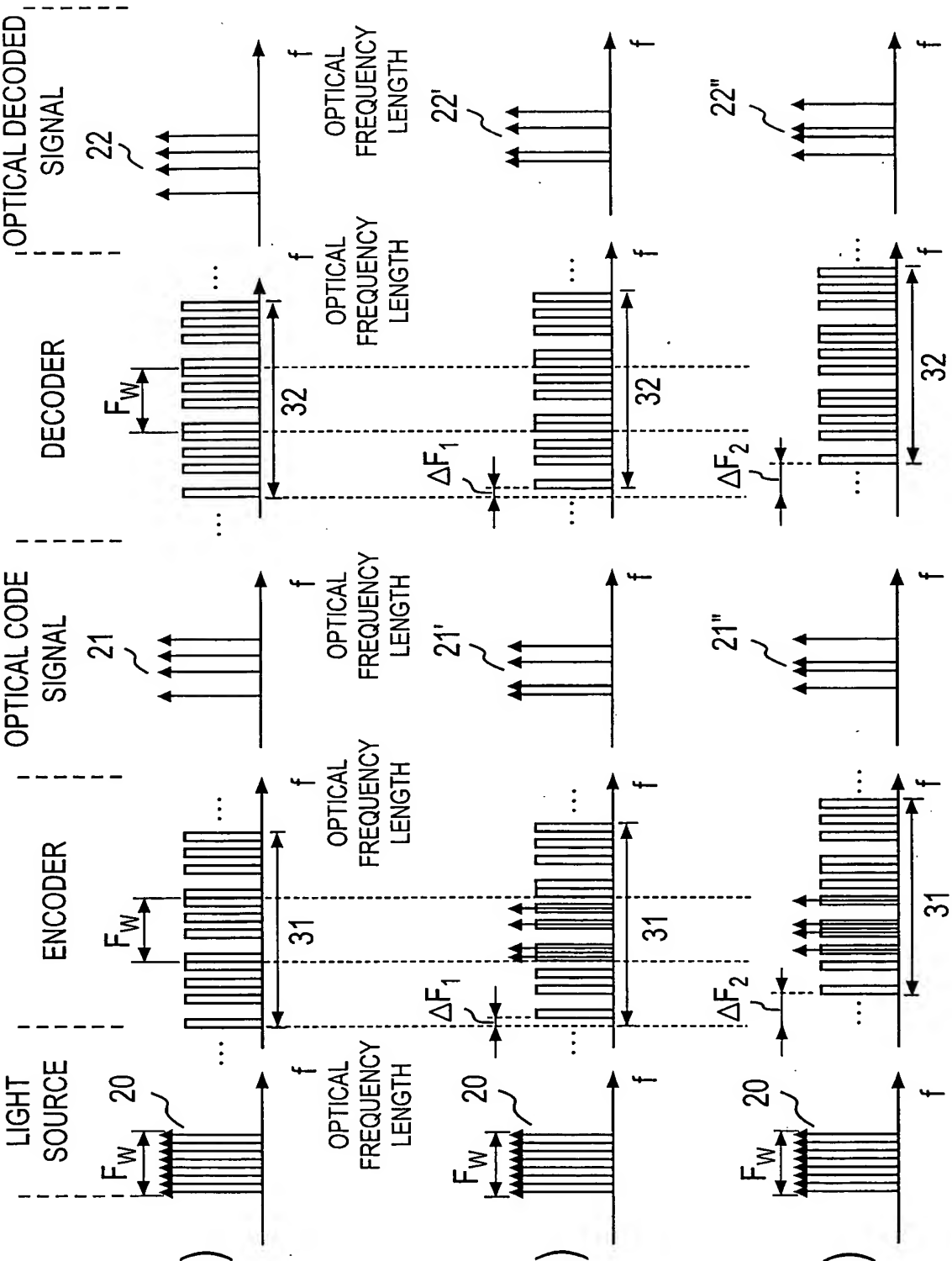


FIG. 20(a)

FIG. 20(b)

FIG. 20(c)

FIG. 21

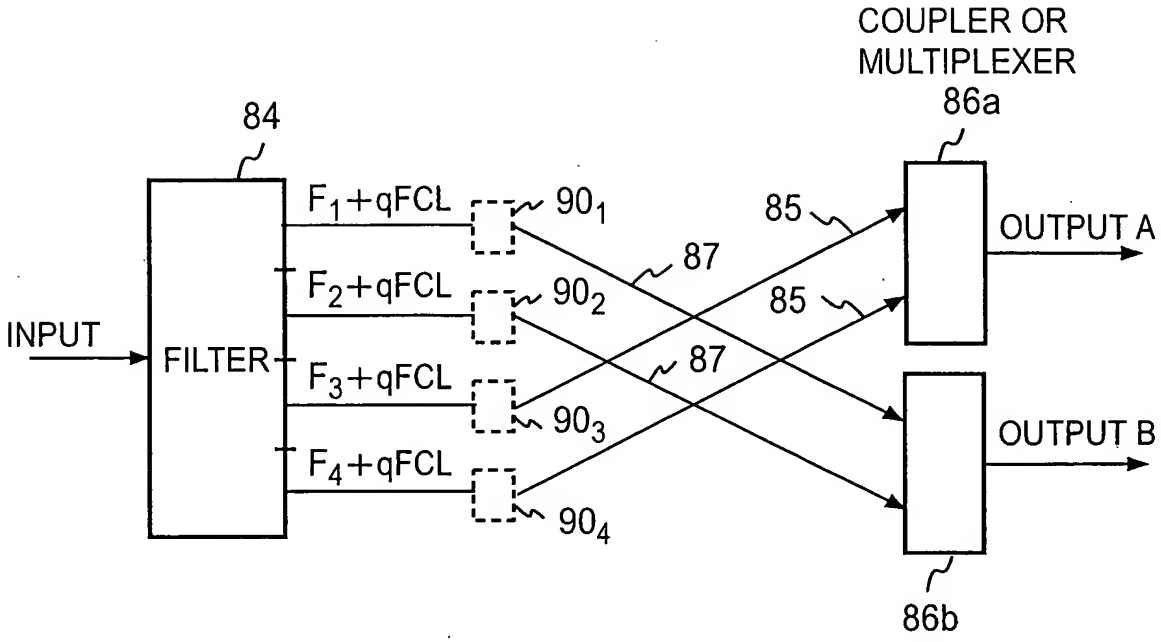
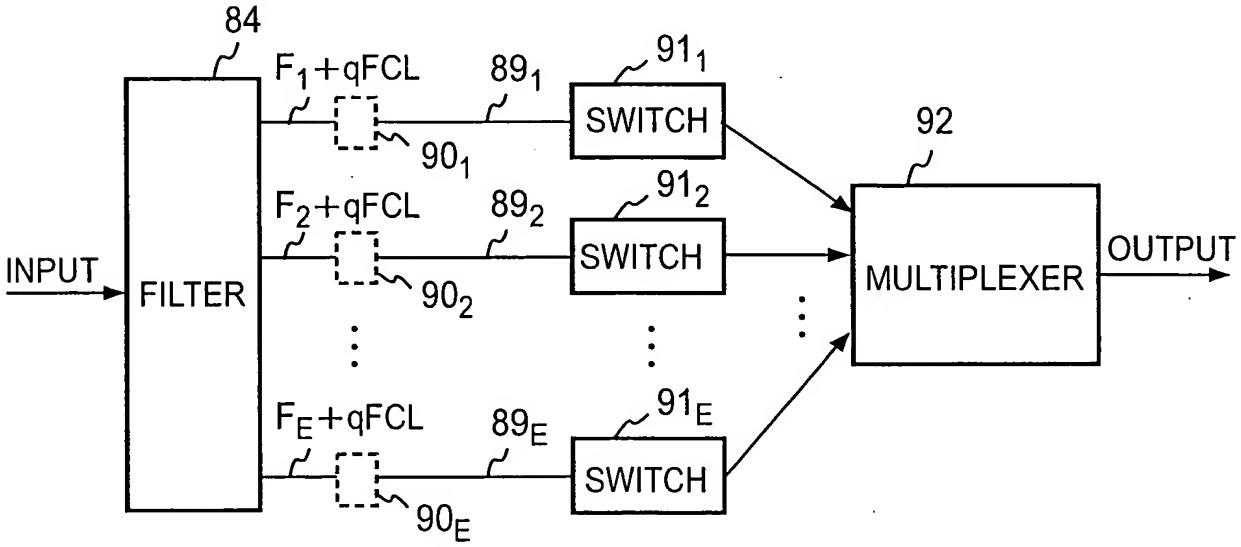

COUPLER OR
MULTIPLEXER
86a
84
F_1+qFCL
F_2+qFCL
F_3+qFCL
F_4+qFCL
90_1
90_2
90_3
90_4
87
87
85
85
INPUT
FILTER
OUTPUT A
OUTPUT B
86b

FIG. 22


84
F_1+qFCL
F_2+qFCL
F_E+qFCL
89_1
89_2
89_E
90_1
90_2
90_E
91_1
91_2
91_E
SWITCH
SWITCH
SWITCH
92
INPUT
FILTER
MULTIPLEXER
OUTPUT

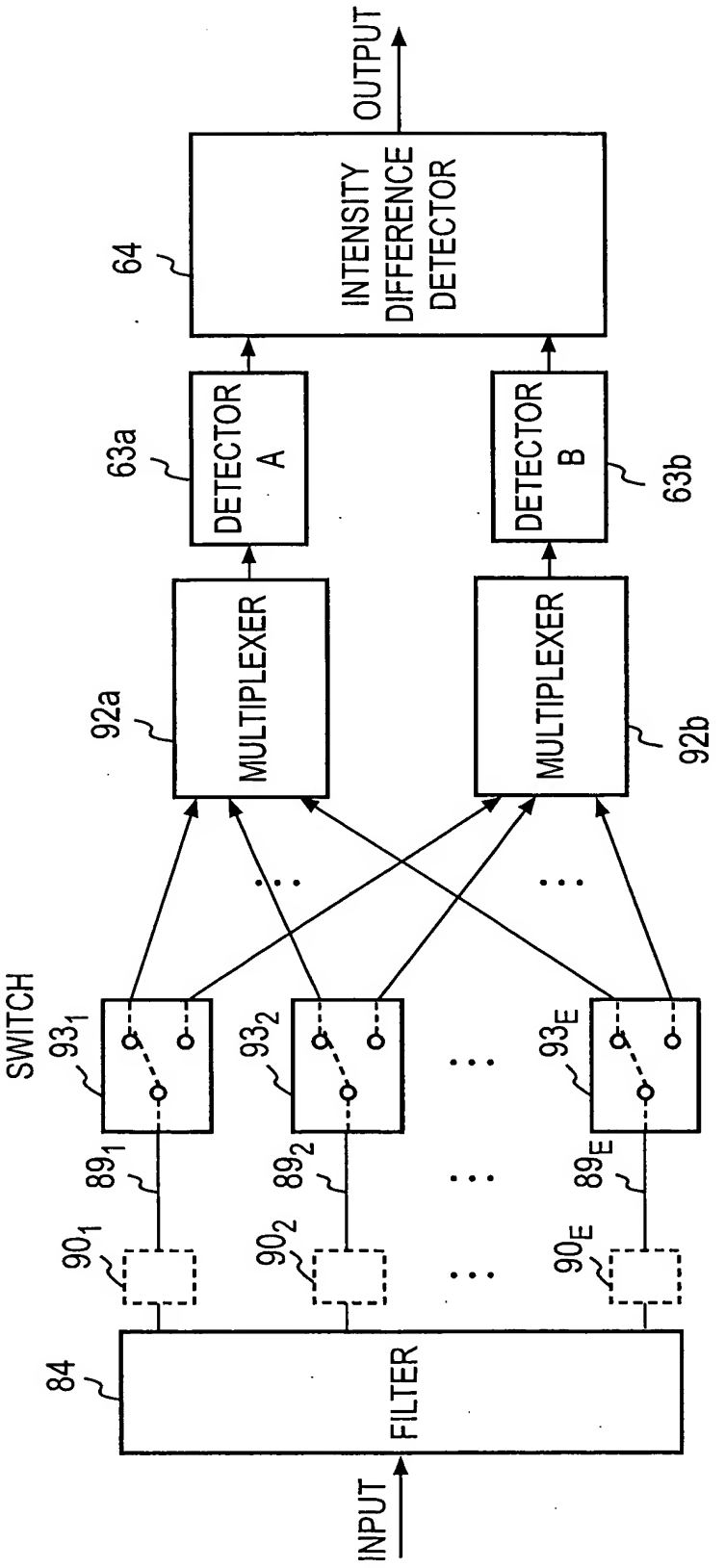
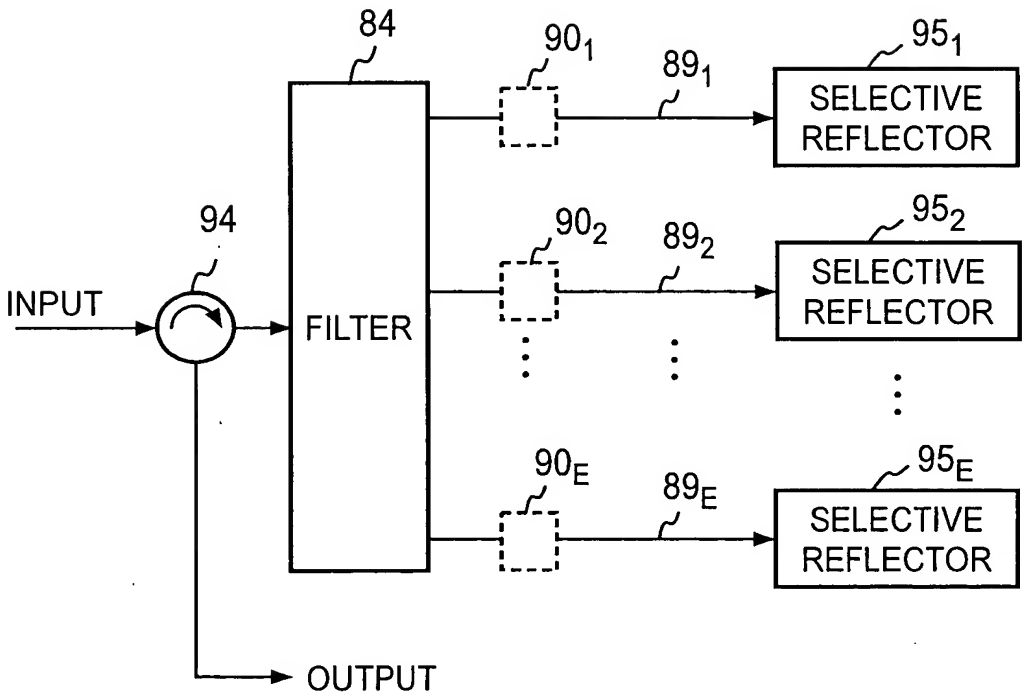

OUTPUT
INTENSITY DIFFERENCE DETECTOR
64
DETECTOR A
63a
DETECTOR B
63b
MULTIPLEXER
92a
MULTIPLEXER
92b
SWITCH
93_1
93_2
93_E
89_1
89_2
89_E
90_1
90_2
90_E
84
FILTER
INPUT

FIG. 23

FIG. 24


84
90_1
89_1
95_1
SELECTIVE REFLECTOR
94
90_2
89_2
95_2
SELECTIVE REFLECTOR
INPUT
FILTER
90_E
89_E
95_E
SELECTIVE REFLECTOR
OUTPUT

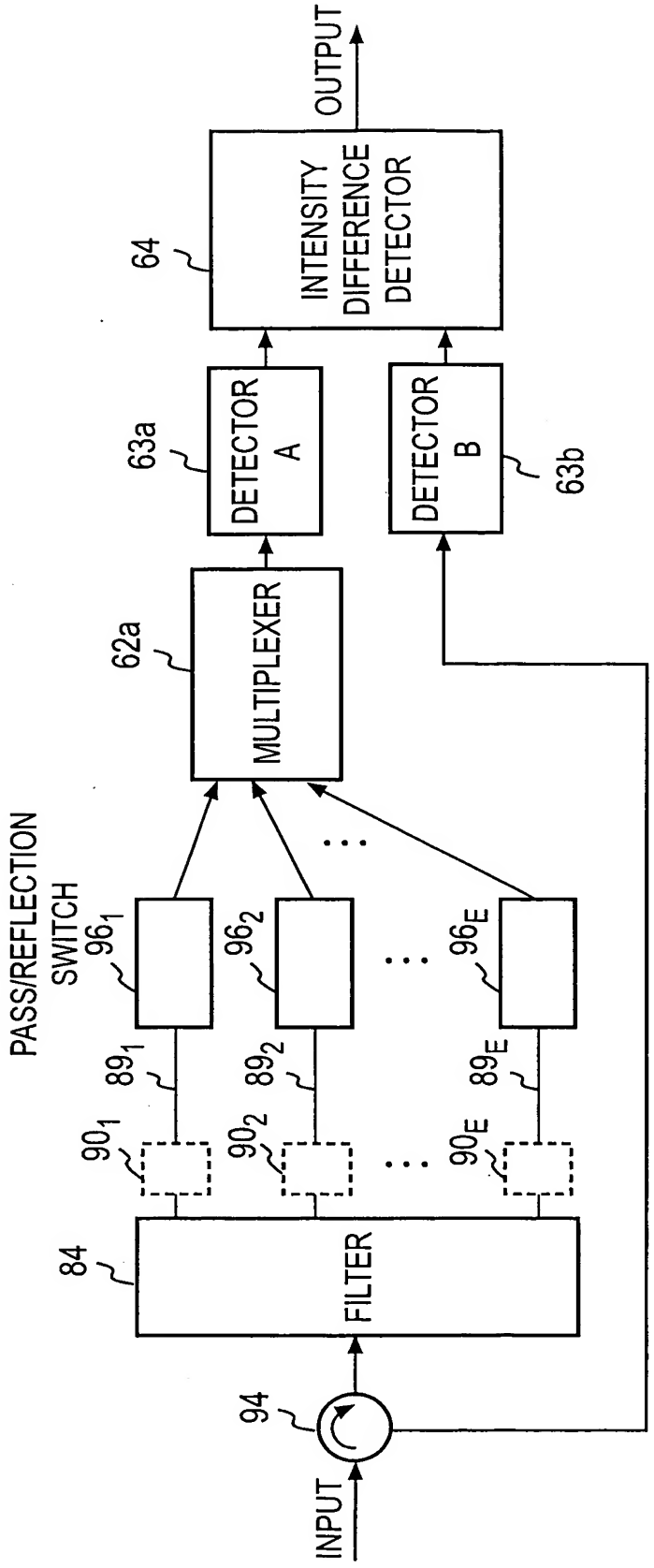

INPUT
94
84
FILTER
90_1
90_2
90_E
89_1
89_2
89_E
PASS/REFLECTION SWITCH
96_1
96_2
96_E
62a
MULTIPLEXER
63a
DETECTOR A
63b
DETECTOR B
64
INTENSITY DIFFERENCE DETECTOR
OUTPUT

FIG. 25

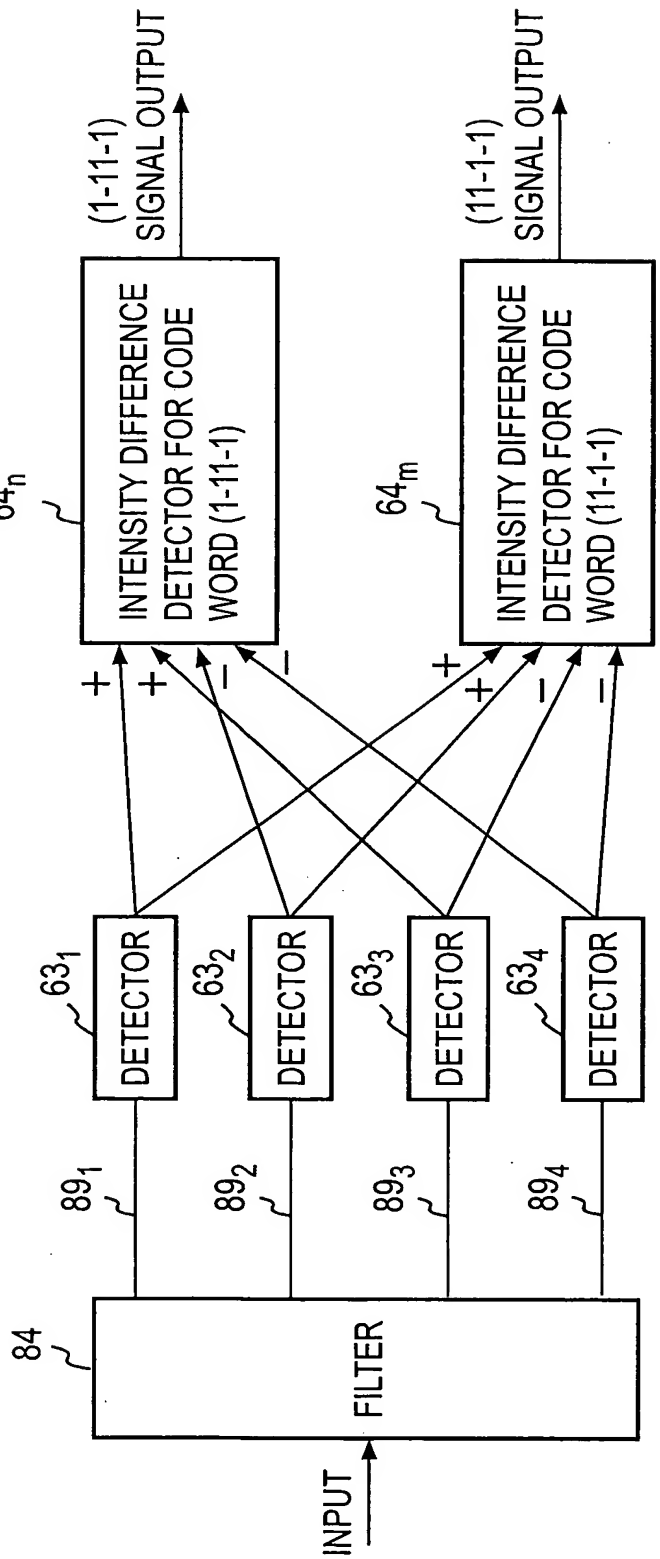

INPUT
FILTER
84
89_1
89_2
89_3
89_4
63_1 DETECTOR
63_2 DETECTOR
63_3 DETECTOR
63_4 DETECTOR
+
+
−
−
+
+
−
−
64_n
INTENSITY DIFFERENCE DETECTOR FOR CODE WORD (1-11-1)
(1-11-1) SIGNAL OUTPUT
64_m
INTENSITY DIFFERENCE DETECTOR FOR CODE WORD (11-1-1)
(11-1-1) SIGNAL OUTPUT

FIG. 26

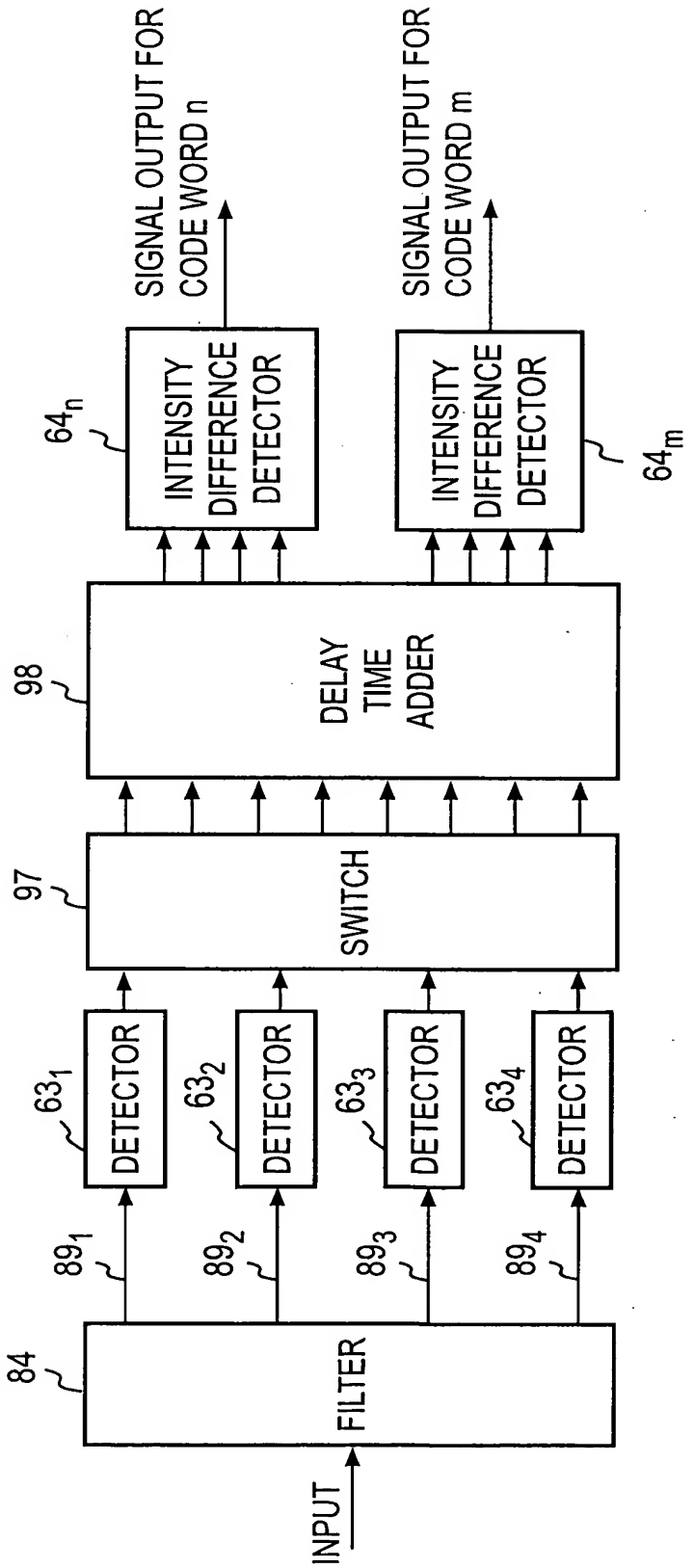

INPUT
84
FILTER
89$_1$
89$_2$
89$_3$
89$_4$
63$_1$
DETECTOR
63$_2$
DETECTOR
63$_3$
DETECTOR
63$_4$
DETECTOR
97
SWITCH
98
DELAY TIME ADDER
64$_n$
INTENSITY DIFFERENCE DETECTOR
SIGNAL OUTPUT FOR CODE WORD n
64$_m$
INTENSITY DIFFERENCE DETECTOR
SIGNAL OUTPUT FOR CODE WORD m

FIG. 27

FIG. 28

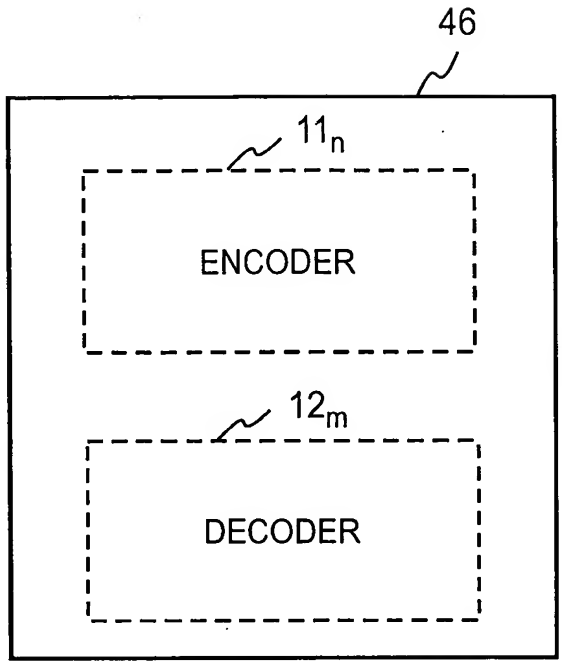

46
11_n
ENCODER
12_m
DECODER

FIG. 29

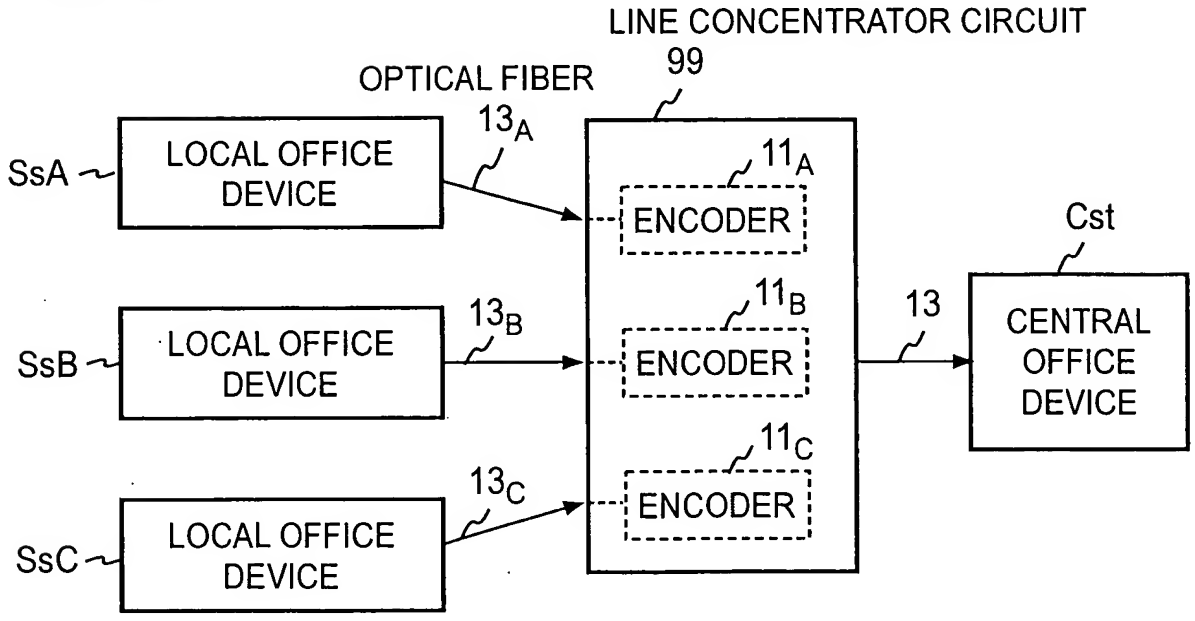

LINE CONCENTRATOR CIRCUIT
99
OPTICAL FIBER
13_A
13_B
13_C
SsA
SsB
SsC
LOCAL OFFICE DEVICE
LOCAL OFFICE DEVICE
LOCAL OFFICE DEVICE
11_A
ENCODER
11_B
ENCODER
11_C
ENCODER
13
Cst
CENTRAL OFFICE DEVICE

FIG. 30

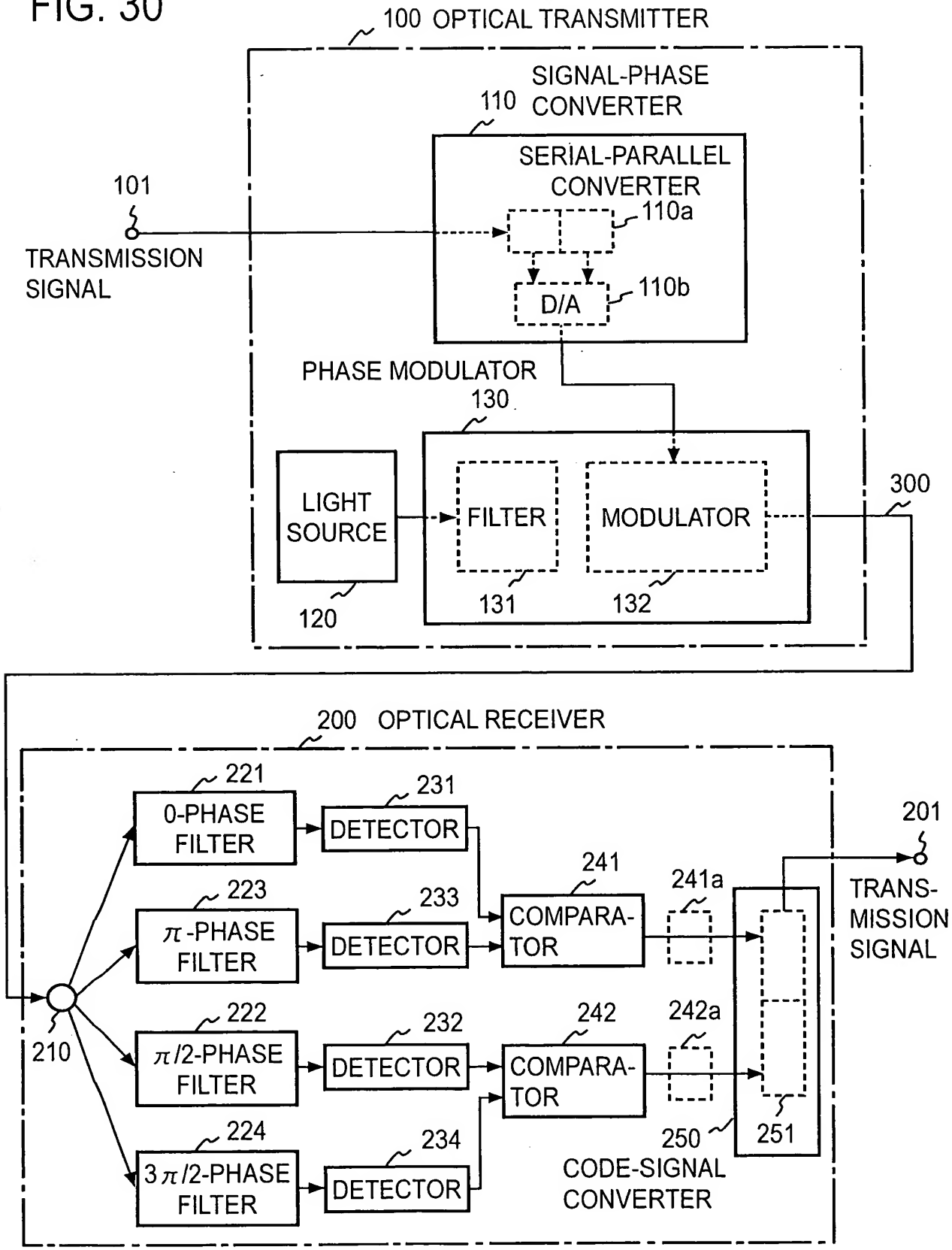

100 OPTICAL TRANSMITTER
SIGNAL-PHASE CONVERTER
110
SERIAL-PARALLEL CONVERTER
110a
110b
D/A
101
TRANSMISSION SIGNAL
PHASE MODULATOR
130
LIGHT SOURCE
120
FILTER
131
MODULATOR
132
300
200 OPTICAL RECEIVER
221
0-PHASE FILTER
231
DETECTOR
223
π-PHASE FILTER
233
DETECTOR
222
π/2-PHASE FILTER
232
DETECTOR
224
3π/2-PHASE FILTER
234
DETECTOR
210
241
COMPARA-TOR
241a
242
COMPARA-TOR
242a
250
251
CODE-SIGNAL CONVERTER
201
TRANS-MISSION SIGNAL

FIG. 31(a) PHASE 0

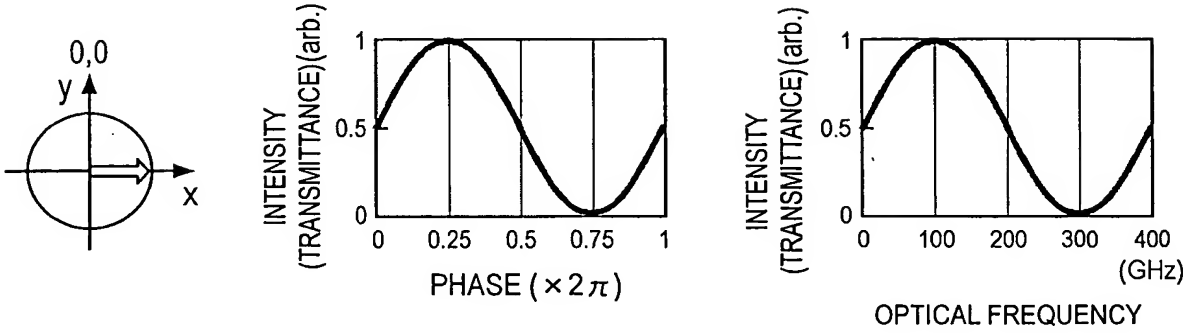


FIG. 31(b) PHASE π/2

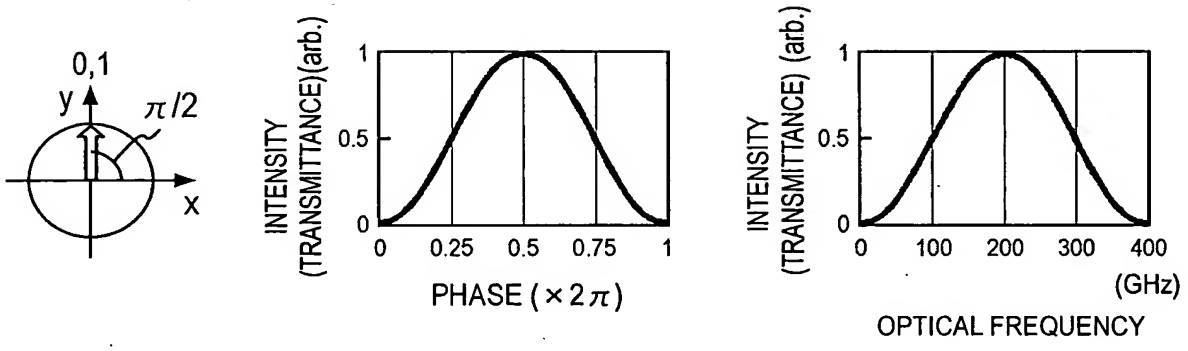


FIG. 31(c) PHASE π

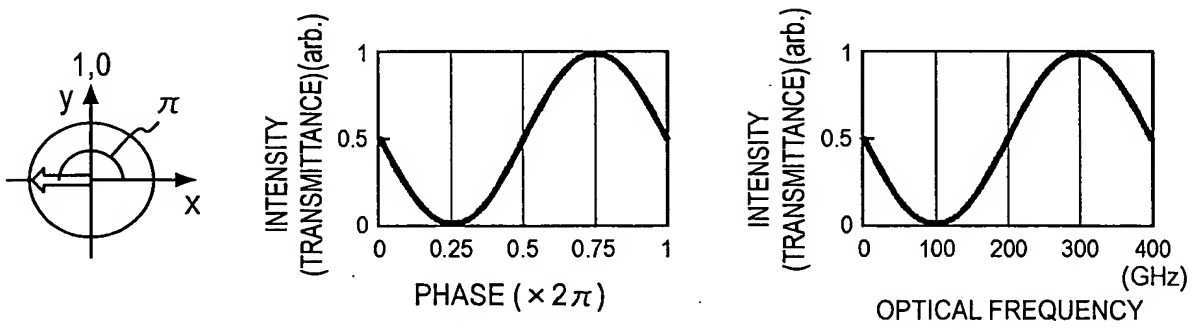
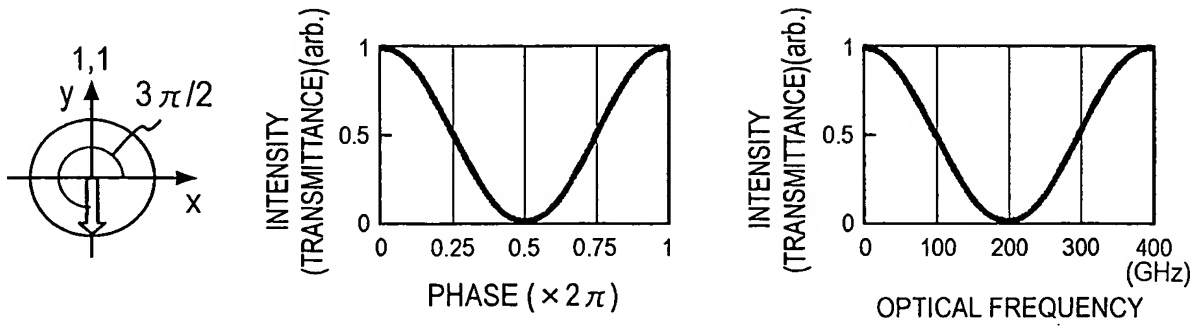


FIG. 31(d) PHASE 3π/2



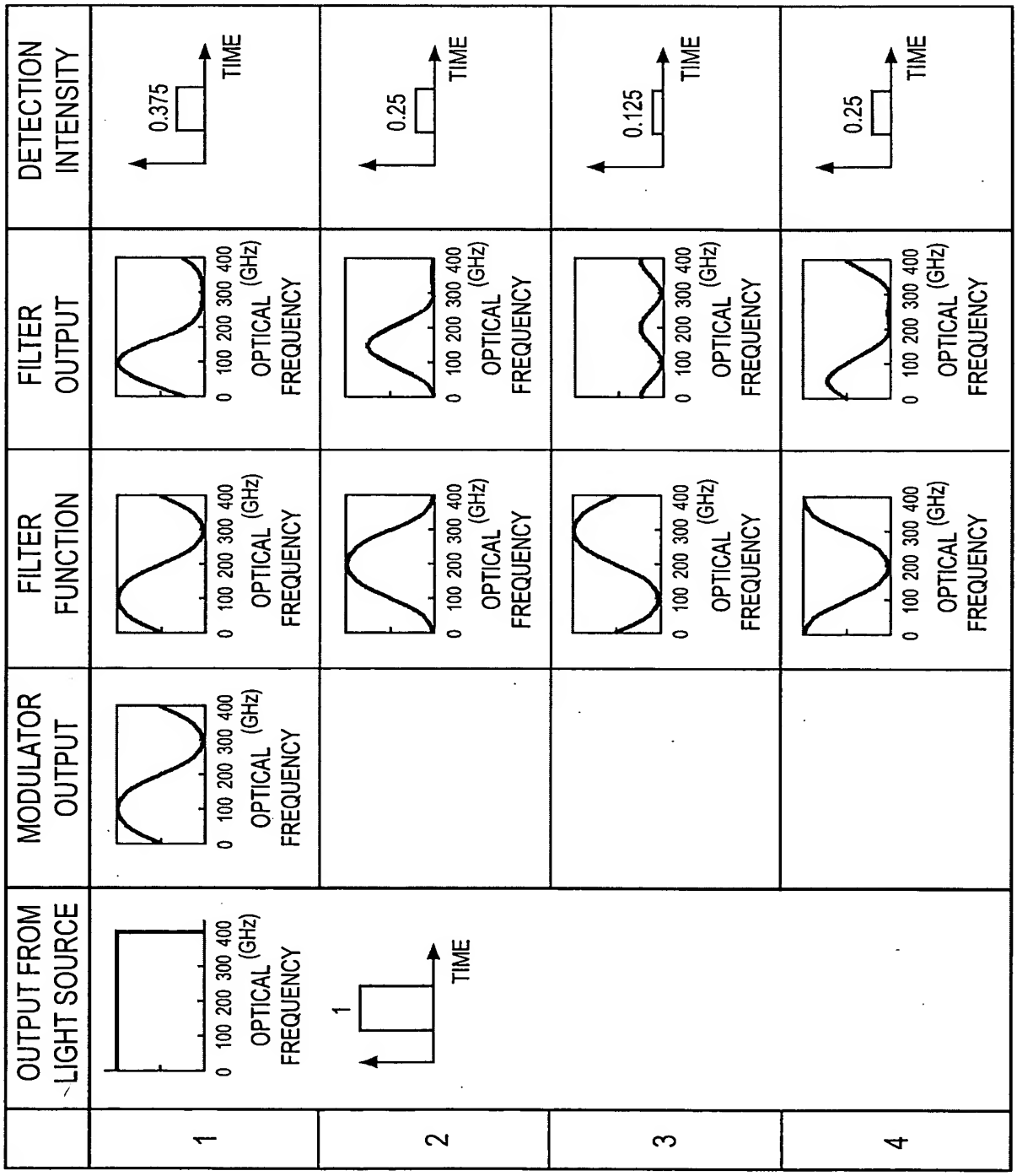

OUTPUT FROM LIGHT SOURCE
MODULATOR OUTPUT
FILTER FUNCTION
FILTER OUTPUT
DETECTION INTENSITY
1
2
3
4
0 100 200 300 400
OPTICAL FREQUENCY (GHz)
1
TIME
0.375
0.25
0.125

FIG. 32-1

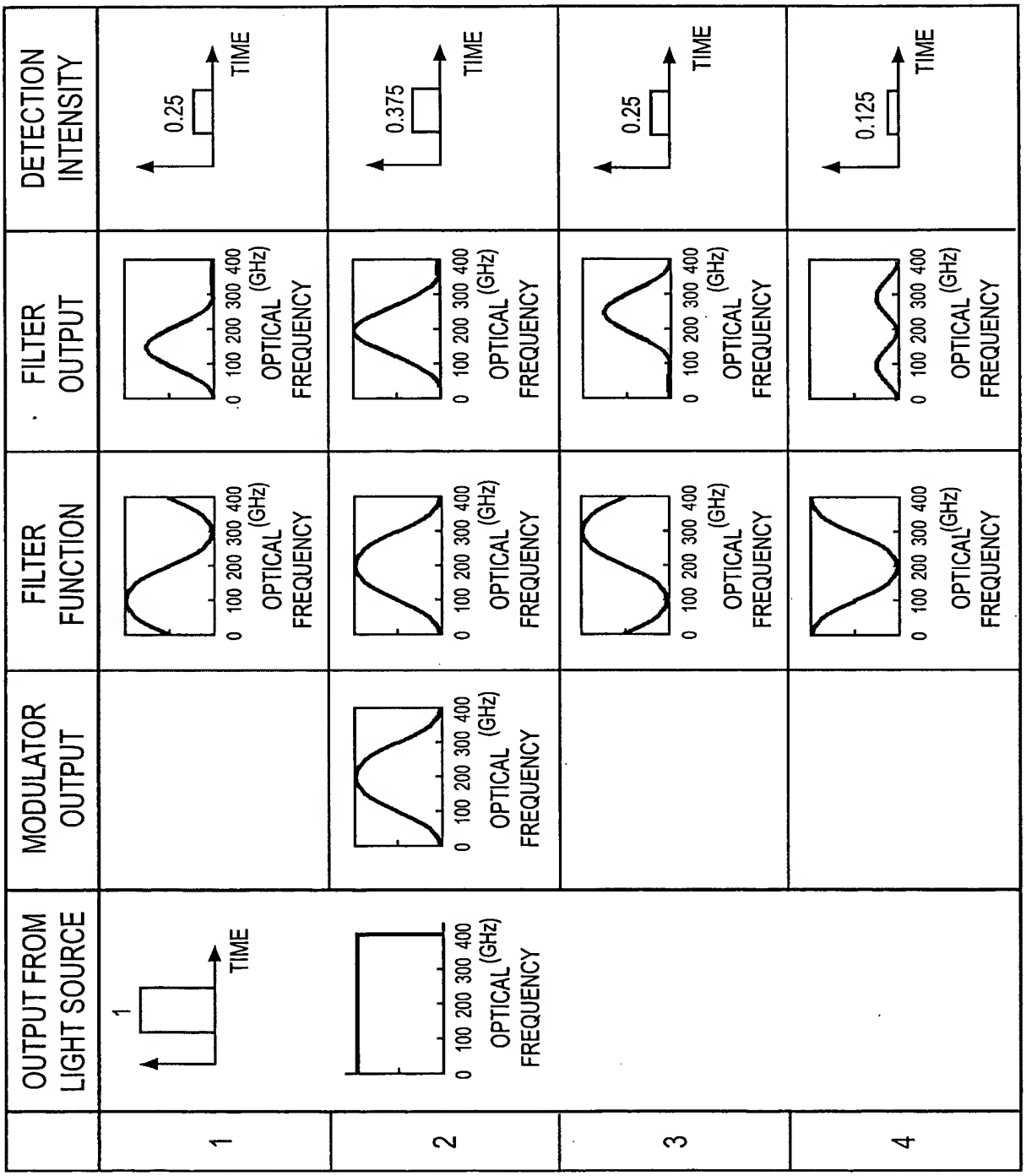

OUTPUT FROM LIGHT SOURCE
MODULATOR OUTPUT
FILTER FUNCTION
FILTER OUTPUT
DETECTION INTENSITY
1
2
3
4
1
TIME
0 100 200 300 400
OPTICAL FREQUENCY (GHz)
0.25
0.375
0.25
0.125
TIME

FIG. 32-2

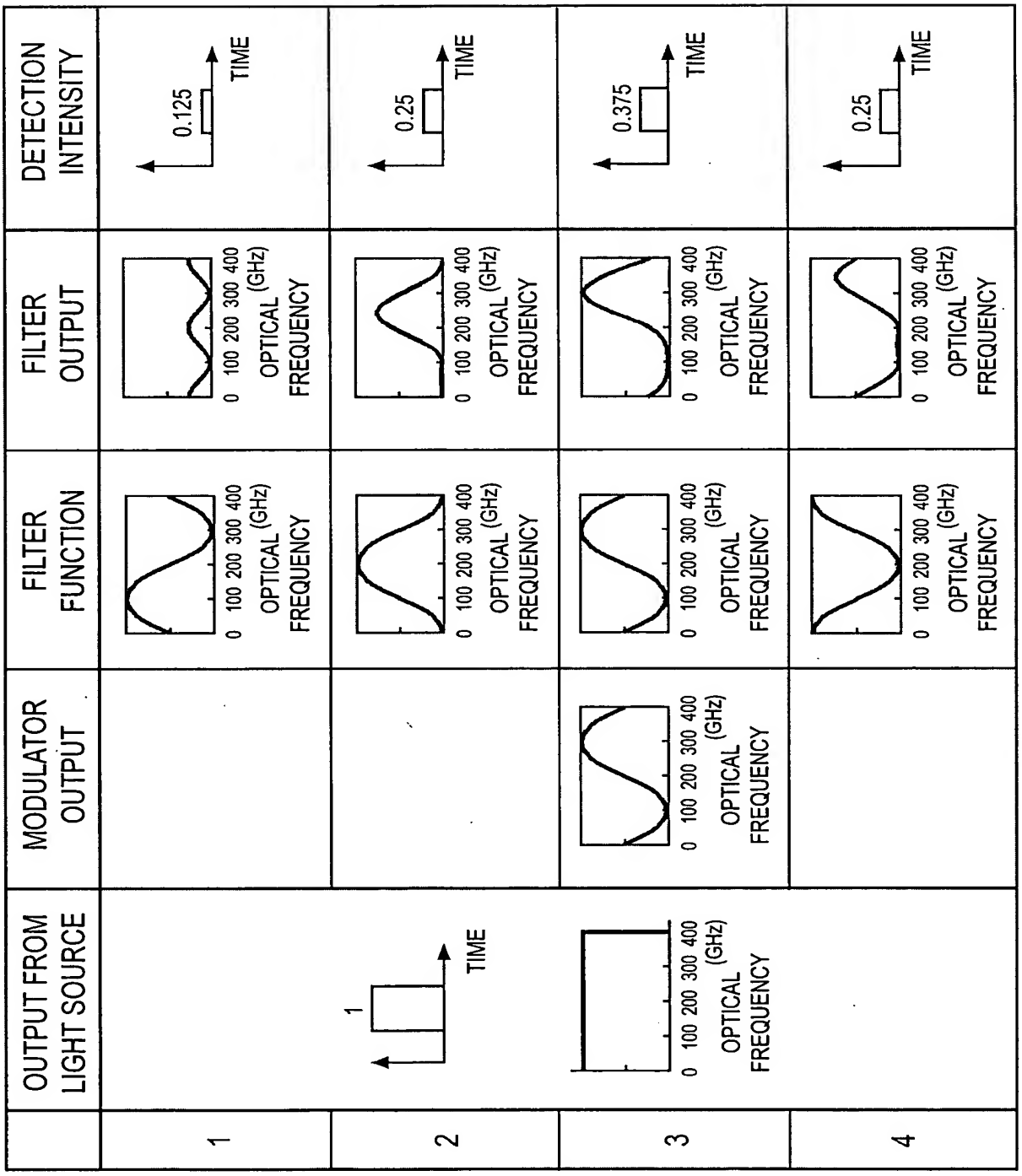

OUTPUT FROM LIGHT SOURCE
MODULATOR OUTPUT
FILTER FUNCTION
FILTER OUTPUT
DETECTION INTENSITY
1
2
3
4
1
TIME
0 100 200 300 400
OPTICAL FREQUENCY (GHz)
0.125
0.25
0.375
0.25
TIME

FIG. 32-3

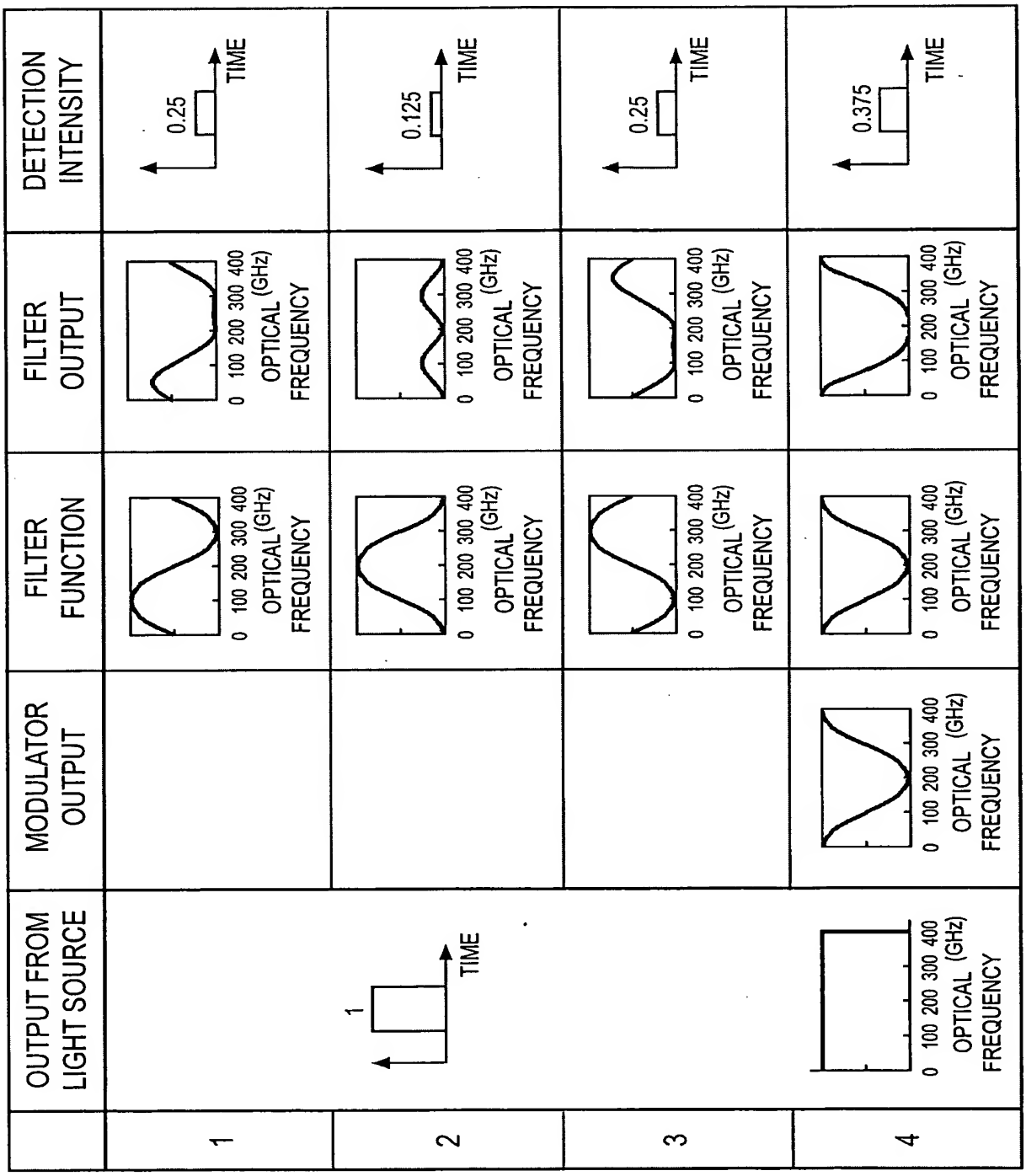
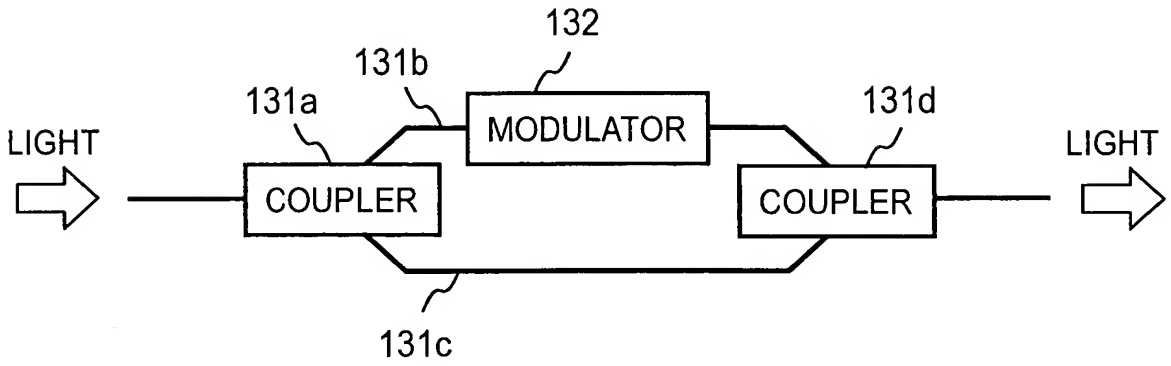

OUTPUT FROM LIGHT SOURCE
MODULATOR OUTPUT
FILTER FUNCTION
FILTER OUTPUT
DETECTION INTENSITY
1
2
3
4
1
TIME
0.25
0.125
0.375
0 100 200 300 400
OPTICAL (GHz)
FREQUENCY

FIG. 32-4

FIG. 33


132
131b
131a
MODULATOR
131d
LIGHT
LIGHT
COUPLER
COUPLER
131c

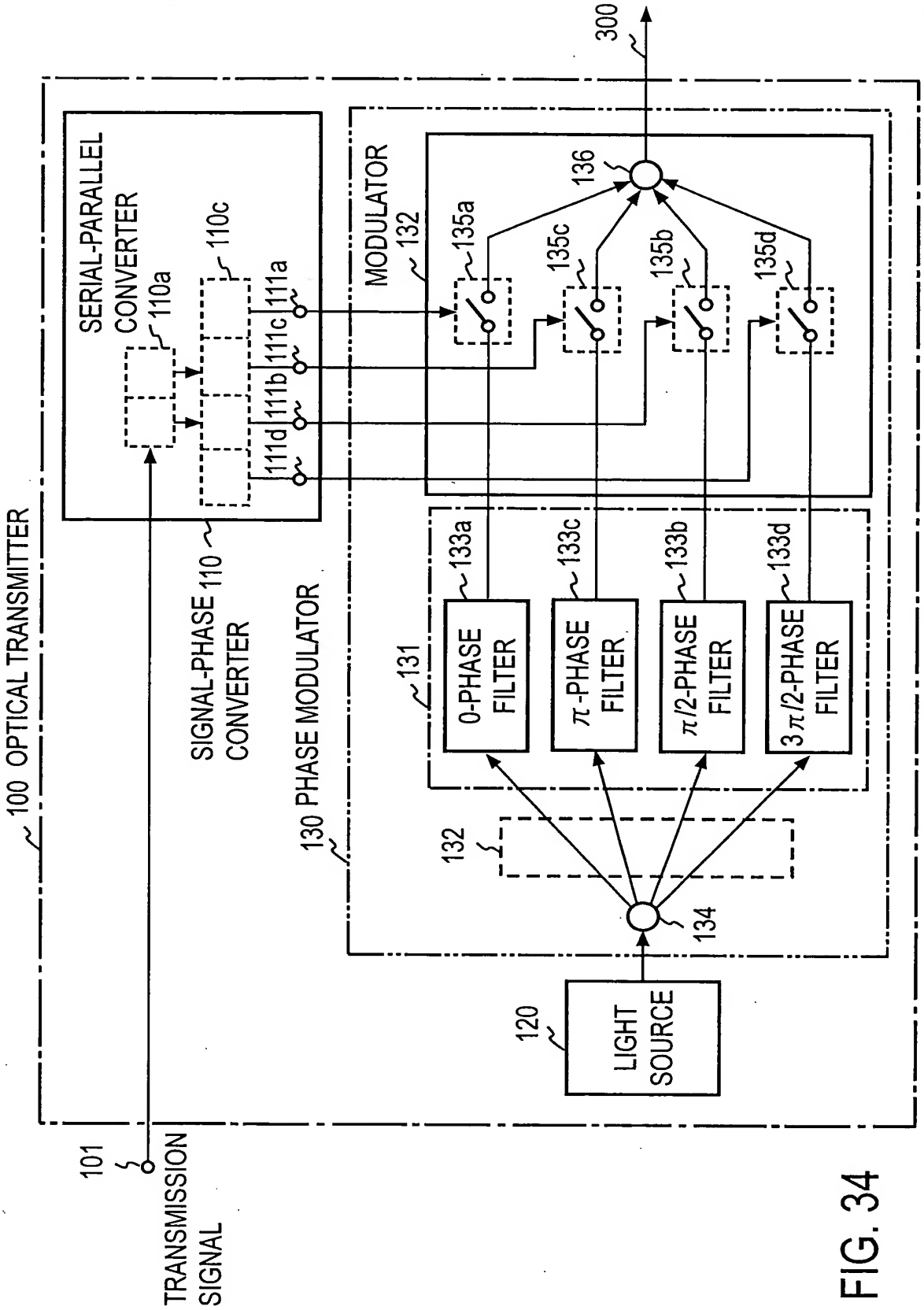

100 OPTICAL TRANSMITTER
SERIAL-PARALLEL CONVERTER
110a
110c
111a
111b
111c
111d
SIGNAL-PHASE CONVERTER
110
130 PHASE MODULATOR
MODULATOR
132
135a
135b
135c
135d
136
300
131
133a
133b
133c
133d
0-PHASE FILTER
π-PHASE FILTER
π/2-PHASE FILTER
3π/2-PHASE FILTER
132
134
120
LIGHT SOURCE
101
TRANSMISSION SIGNAL

FIG. 34

FIG. 35(a)

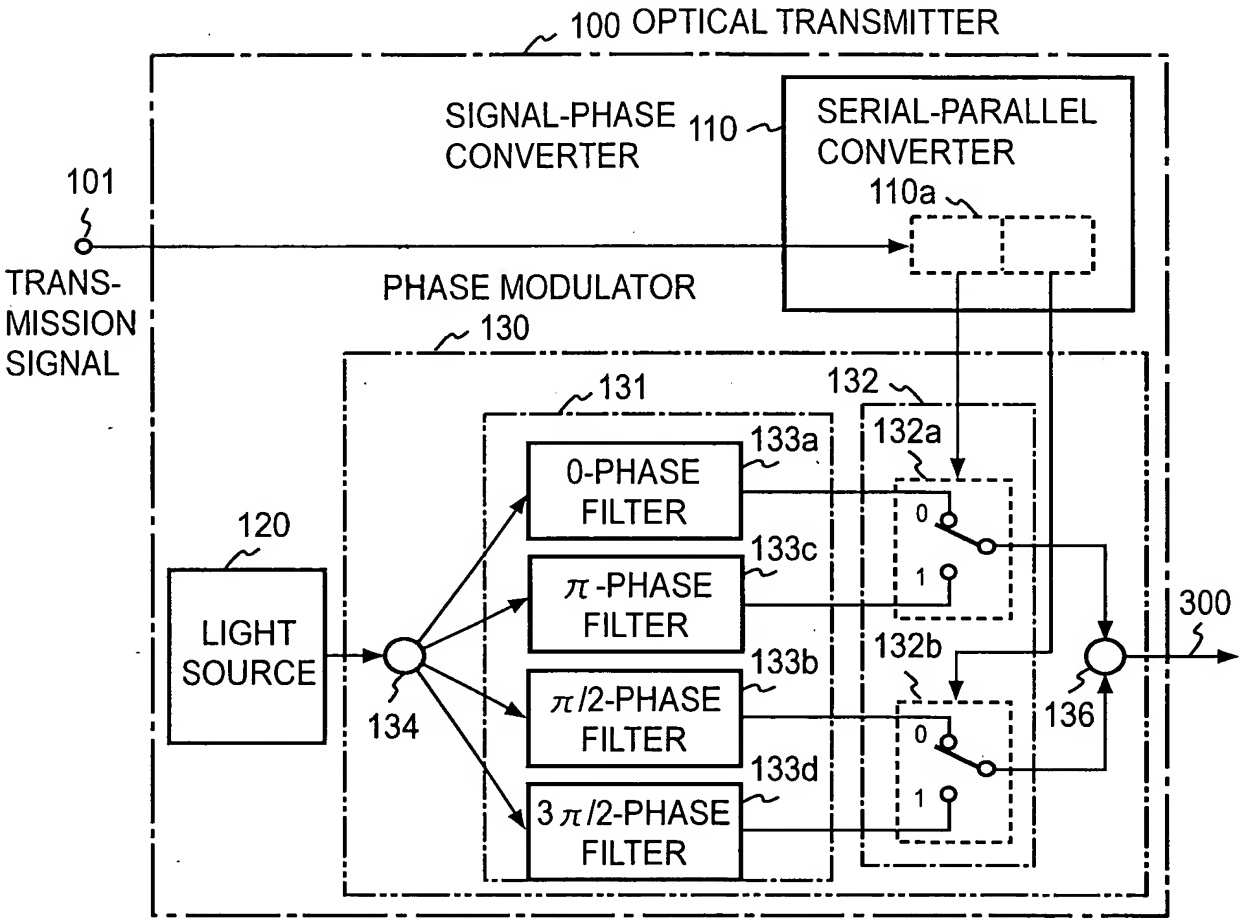


FIG. 35(b)

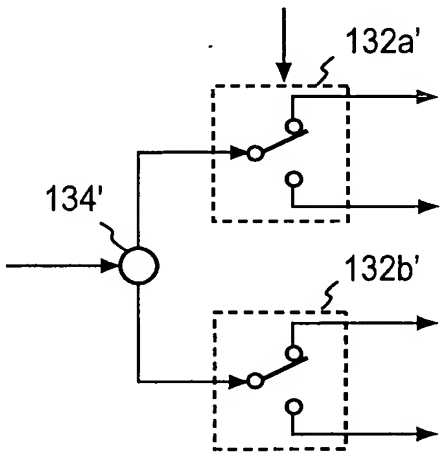


FIG. 36(a)

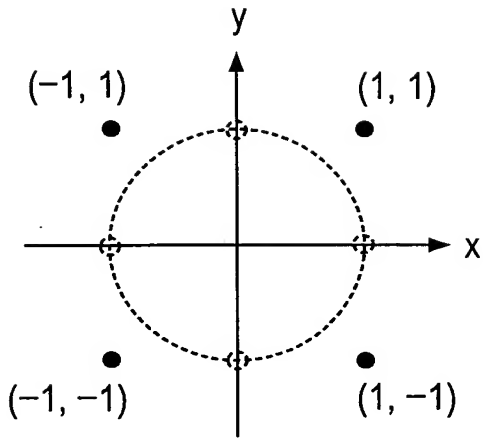


FIG. 36(b)

DATA SET	COORDINATE POINTS	SELECTED FILTER PHASES
0, 0	1, 1	0, $\pi/2$
0, 1	1, −1	0, $3\pi/2$
1, 0	−1, 1	π, $\pi/2$
1, 1	−1, −1	π, $3\pi/2$

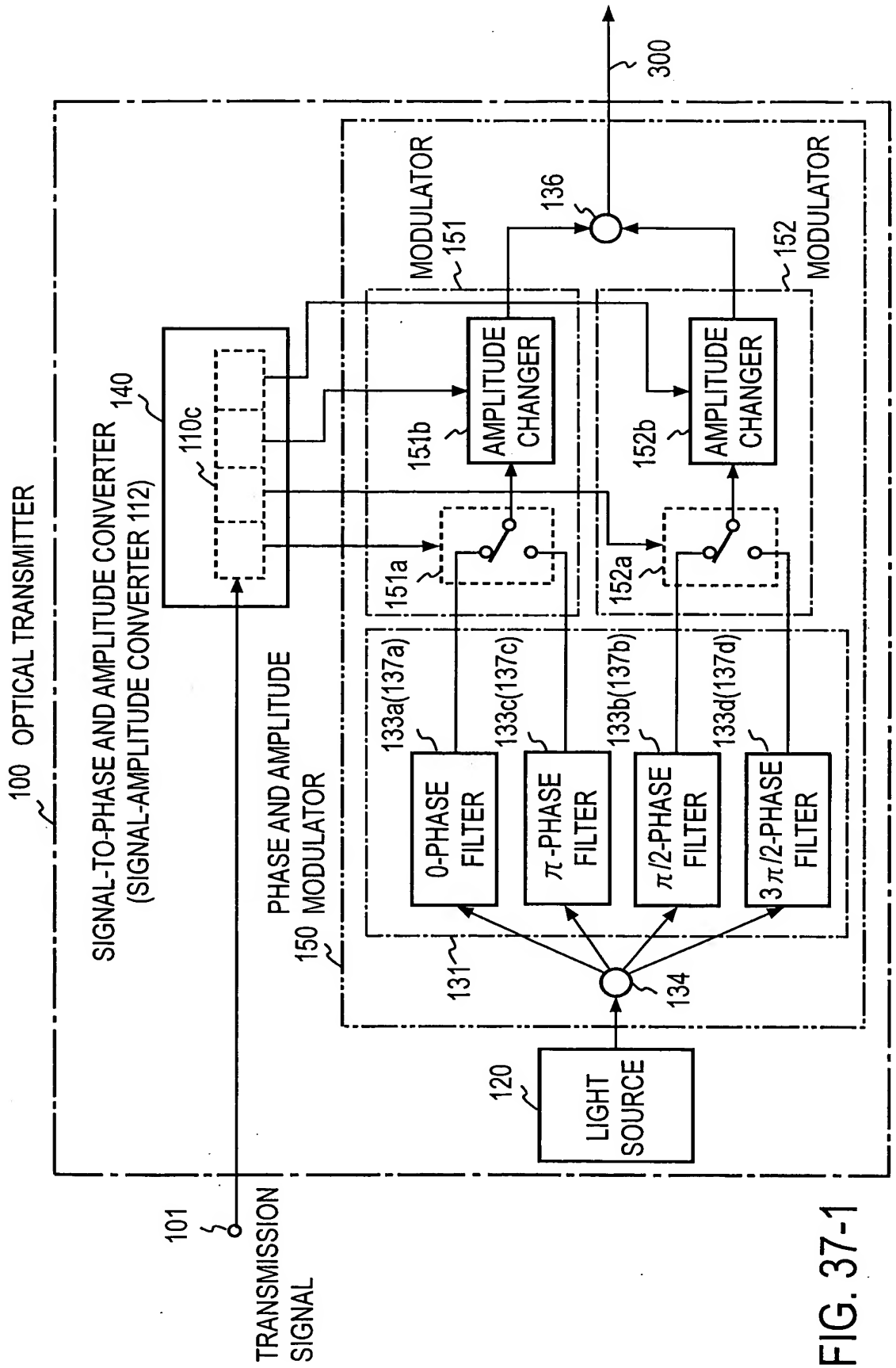

100 OPTICAL TRANSMITTER
SIGNAL-TO-PHASE AND AMPLITUDE CONVERTER (SIGNAL-AMPLITUDE CONVERTER 112)
140
110c
PHASE AND AMPLITUDE MODULATOR
150
MODULATOR
151
MODULATOR
152
AMPLITUDE CHANGER
151b
AMPLITUDE CHANGER
152b
151a
152a
136
300
133a(137a)
133c(137c)
133b(137b)
133d(137d)
0-PHASE FILTER
π-PHASE FILTER
π/2-PHASE FILTER
3π/2-PHASE FILTER
131
134
120
LIGHT SOURCE
101
TRANSMISSION SIGNAL

FIG. 37-1

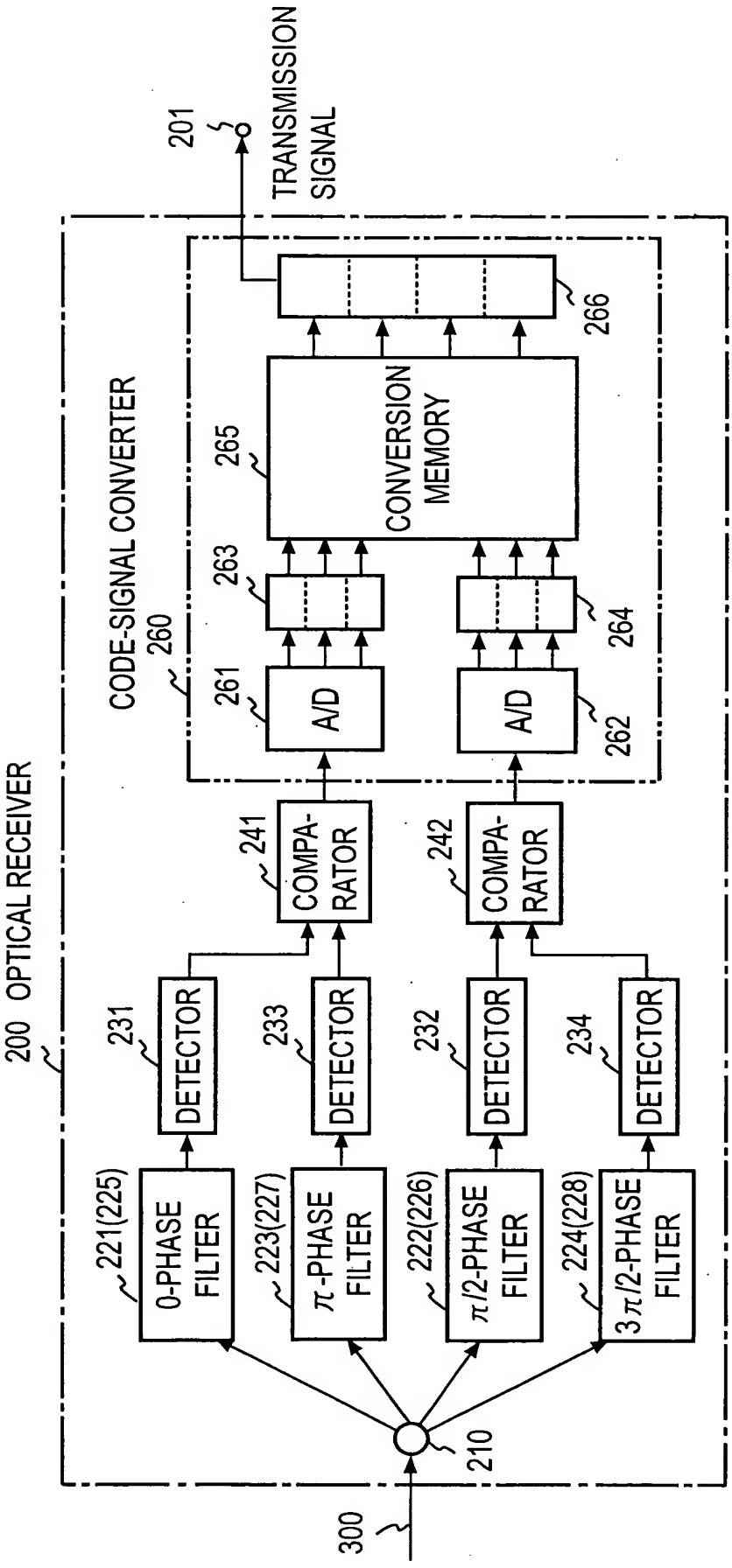

200 OPTICAL RECEIVER
CODE-SIGNAL CONVERTER
260
TRANSMISSION SIGNAL
201
266
CONVERSION MEMORY
265
263
264
261
A/D
262
A/D
241
COMPA-RATOR
242
COMPA-RATOR
231
DETECTOR
233
DETECTOR
232
DETECTOR
234
DETECTOR
221(225)
0-PHASE FILTER
223(227)
π-PHASE FILTER
222(226)
π/2-PHASE FILTER
224(228)
3π/2-PHASE FILTER
210
300

FIG. 37-2

FIG. 38(a)

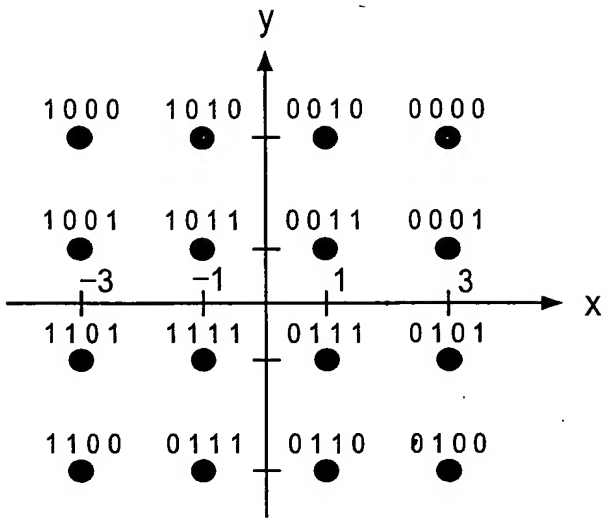


FIG. 38(b)

DATA SET	0	$\pi/2$	π	$3\pi/2$	COMPARATOR	
					241	242
0 0 0 0	3	3	0	0	3	3
0 0 0 1	3	1	0	0	3	1
0 0 1 0	1	3	0	0	1	3
0 0 1 1	1	1	0	0	1	1
0 1 0 0	3	0	0	3	3	−3
0 1 0 1	3	0	0	1	3	−1
0 1 1 0	1	0	0	3	1	−3
0 1 1 1	1	0	0	1	1	−1
1 0 0 0	0	3	3	0	3	3
1 0 0 1	0	1	3	0	3	3
1 0 1 0	0	3	1	0	1	1
1 0 1 1	0	1	1	0	1	1
1 1 0 0	0	0	3	3	−3	−3
1 1 0 1	0	0	3	1	−3	−1
1 1 1 0	0	0	1	3	−1	−3
1 1 1 1	0	0	1	1	−1	−1

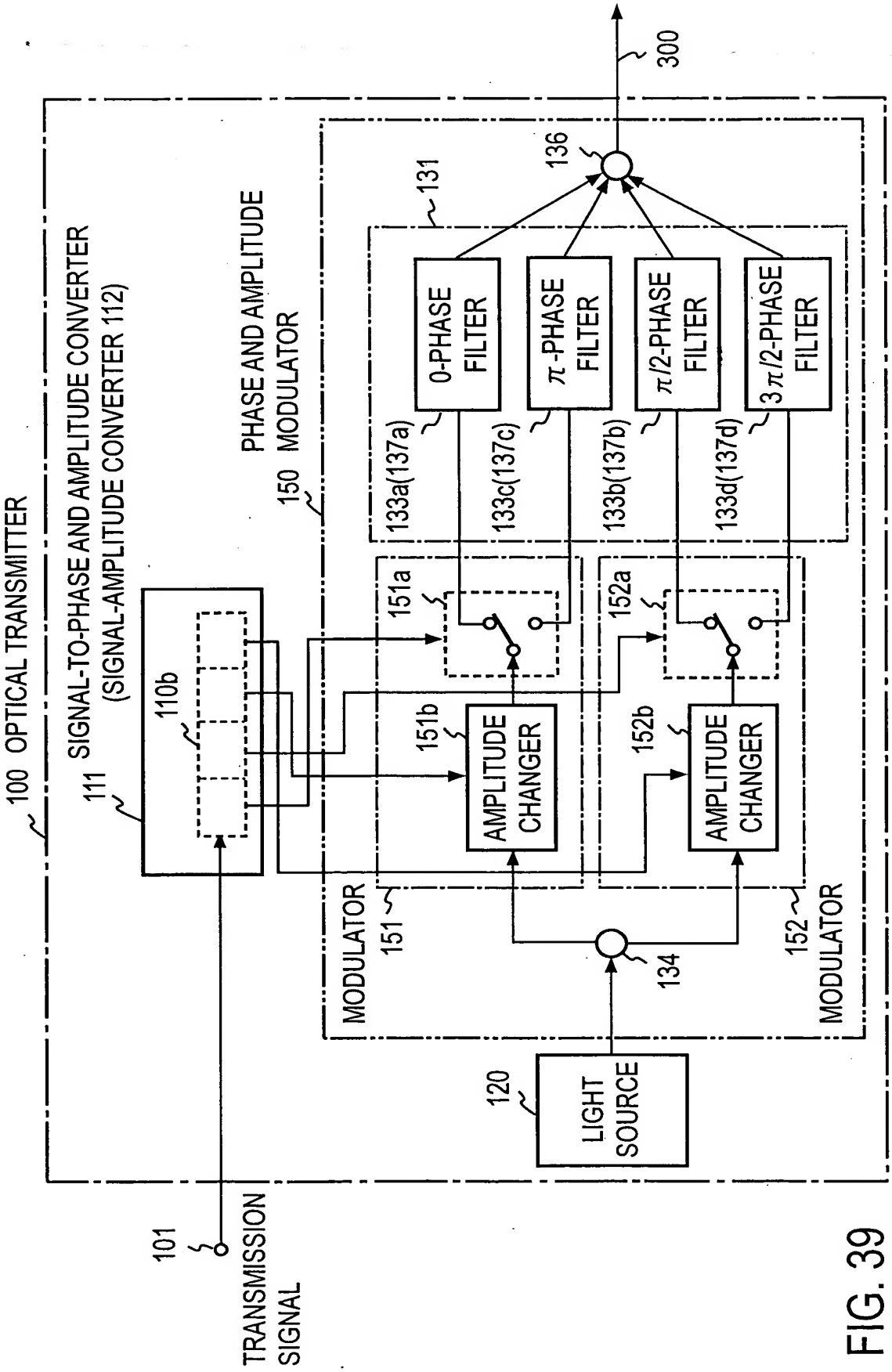

100 OPTICAL TRANSMITTER
SIGNAL-TO-PHASE AND AMPLITUDE CONVERTER
(SIGNAL-AMPLITUDE CONVERTER 112)
111
110b
PHASE AND AMPLITUDE
MODULATOR
150
131
136
300
0-PHASE FILTER
π-PHASE FILTER
π/2-PHASE FILTER
3π/2-PHASE FILTER
133a(137a)
133c(137c)
133b(137b)
133d(137d)
151a
152a
151b
152b
AMPLITUDE CHANGER
AMPLITUDE CHANGER
MODULATOR
151
MODULATOR
152
134
120
LIGHT SOURCE
101
TRANSMISSION SIGNAL

FIG. 39

FIG. 40

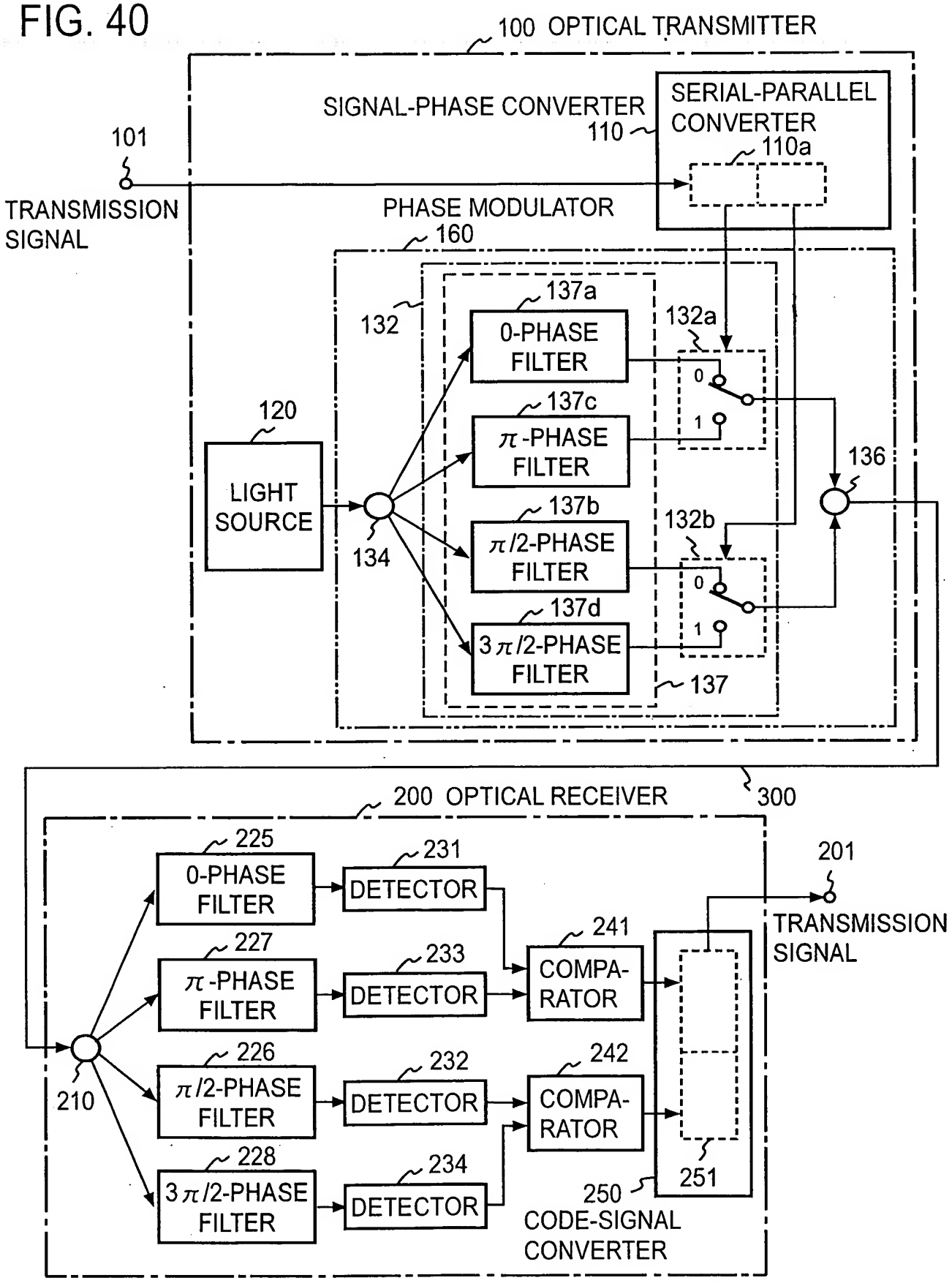

100 OPTICAL TRANSMITTER
SIGNAL-PHASE CONVERTER
110
SERIAL-PARALLEL CONVERTER
110a
101
TRANSMISSION SIGNAL
PHASE MODULATOR
160
132
137a
0-PHASE FILTER
132a
137c
π-PHASE FILTER
120
LIGHT SOURCE
134
137b
π/2-PHASE FILTER
132b
137d
3π/2-PHASE FILTER
137
136
300
200 OPTICAL RECEIVER
225
0-PHASE FILTER
231
DETECTOR
201
TRANSMISSION SIGNAL
227
π-PHASE FILTER
233
DETECTOR
241
COMPA-RATOR
226
π/2-PHASE FILTER
232
DETECTOR
242
COMPA-RATOR
210
228
3π/2-PHASE FILTER
234
DETECTOR
251
250
CODE-SIGNAL CONVERTER

FIG. 41(a)

PHASE 0 (L=4, S=1)

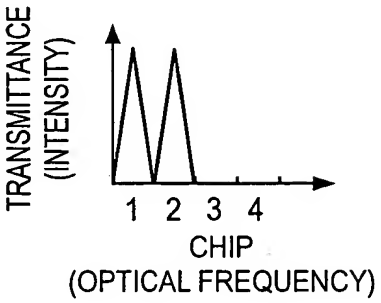


FIG. 41(b)

PHASE $\pi/2$ (L=4, S=1)

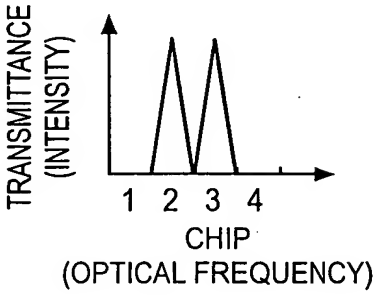


FIG. 41(c)

PHASE π (L=4, S=1)

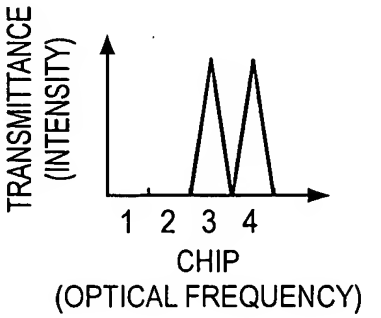
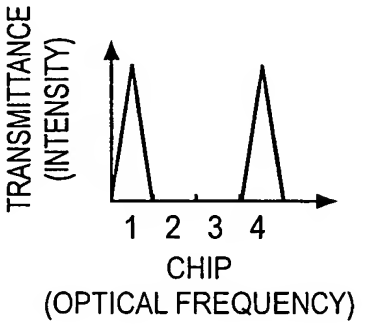


FIG. 41(d)

PHASE $3\pi/2$ (L=4, S=1)



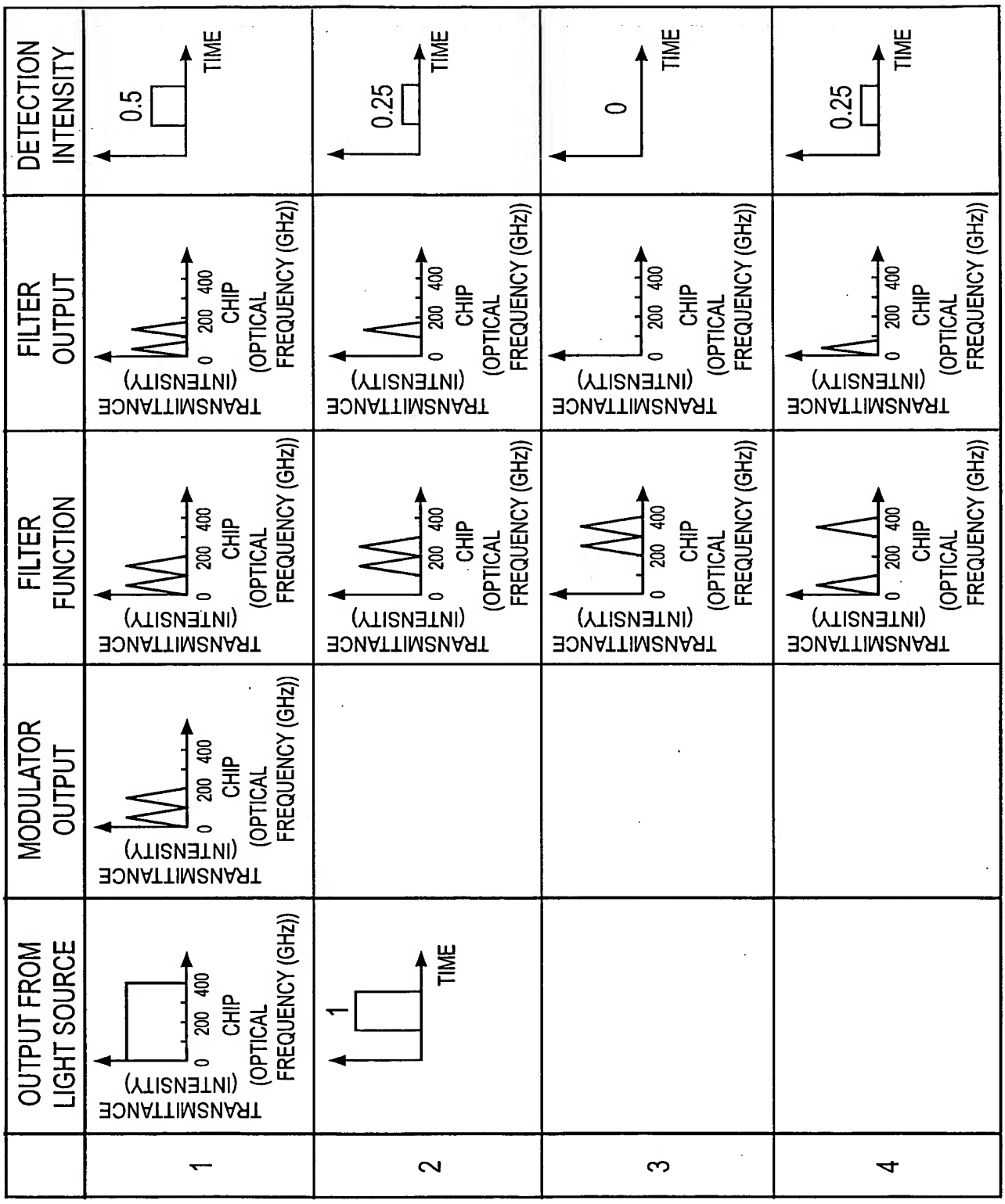

OUTPUT FROM LIGHT SOURCE
MODULATOR OUTPUT
FILTER FUNCTION
FILTER OUTPUT
DETECTION INTENSITY
1
2
3
4
TRANSMITTANCE (INTENSITY)
0
200
400
CHIP (OPTICAL FREQUENCY (GHz))
1
TIME
0.5
0.25
0

FIG. 42-1

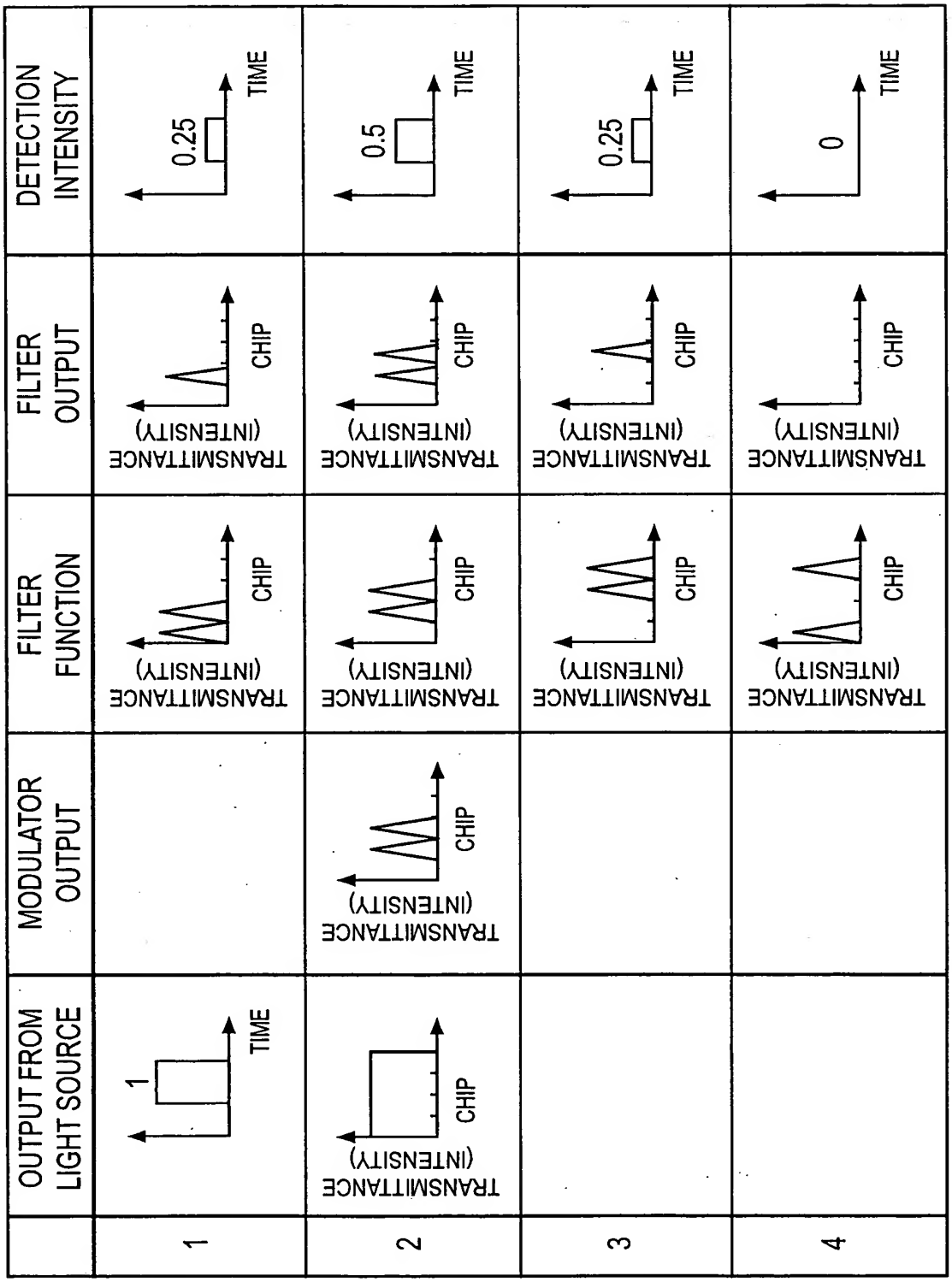

DETECTION INTENSITY
FILTER OUTPUT
FILTER FUNCTION
MODULATOR OUTPUT
OUTPUT FROM LIGHT SOURCE
1
2
3
4
0.25
TIME
0.5
TIME
0.25
TIME
0
TIME
TRANSMITTANCE (INTENSITY)
CHIP
TRANSMITTANCE (INTENSITY)
CHIP
TRANSMITTANCE (INTENSITY)
CHIP
TRANSMITTANCE (INTENSITY)
CHIP
1
TIME
TRANSMITTANCE (INTENSITY)
CHIP
TRANSMITTANCE (INTENSITY)
CHIP
TRANSMITTANCE (INTENSITY)
CHIP
TRANSMITTANCE (INTENSITY)
CHIP
TRANSMITTANCE (INTENSITY)
CHIP
TRANSMITTANCE (INTENSITY)
CHIP
TRANSMITTANCE (INTENSITY)
CHIP
TRANSMITTANCE (INTENSITY)
CHIP

FIG. 42-2

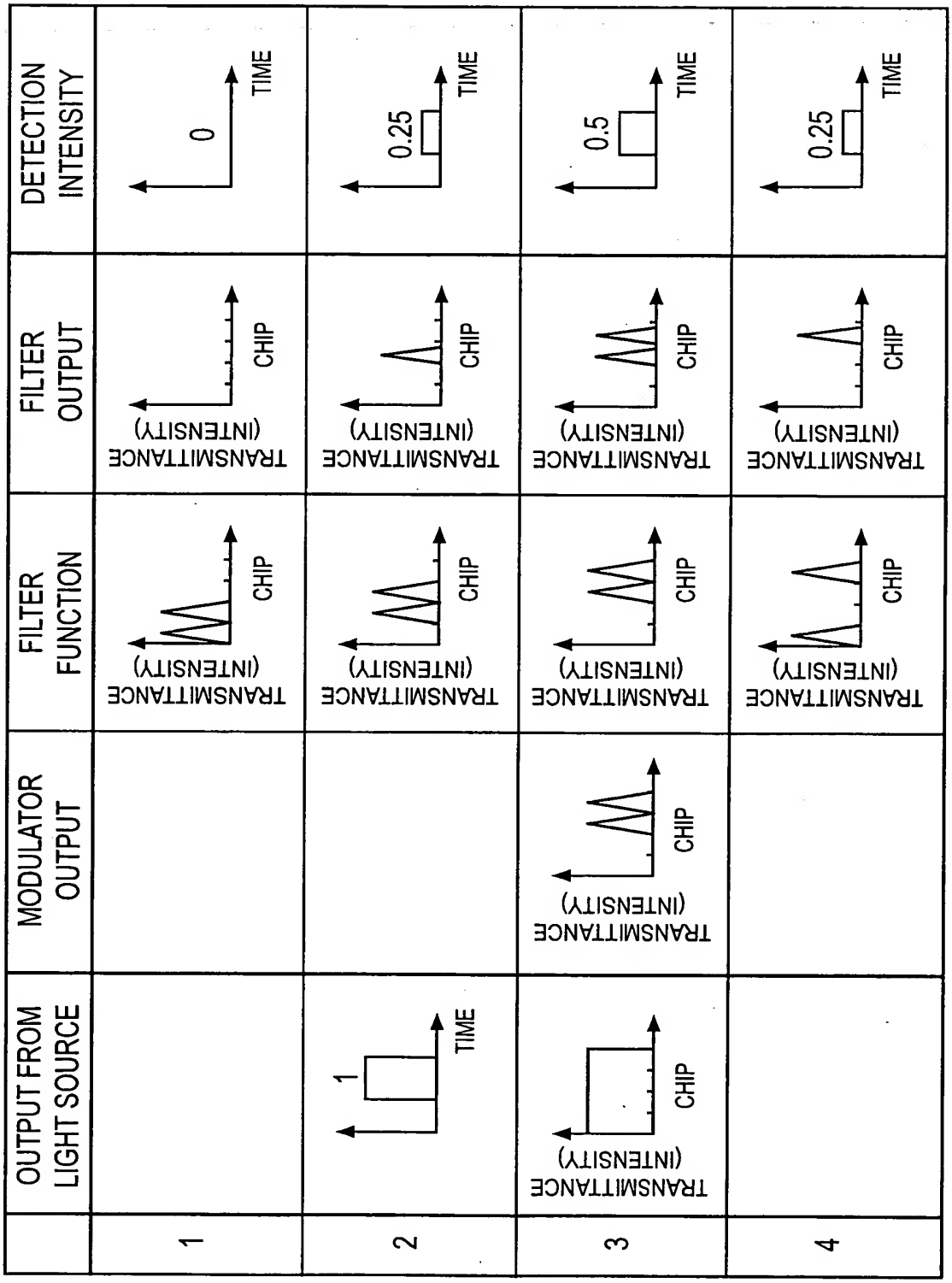

DETECTION INTENSITY
FILTER OUTPUT
FILTER FUNCTION
MODULATOR OUTPUT
OUTPUT FROM LIGHT SOURCE
1
2
3
4
0
0.25
0.5
0.25
1
TIME
CHIP
TRANSMITTANCE (INTENSITY)

FIG. 42-3

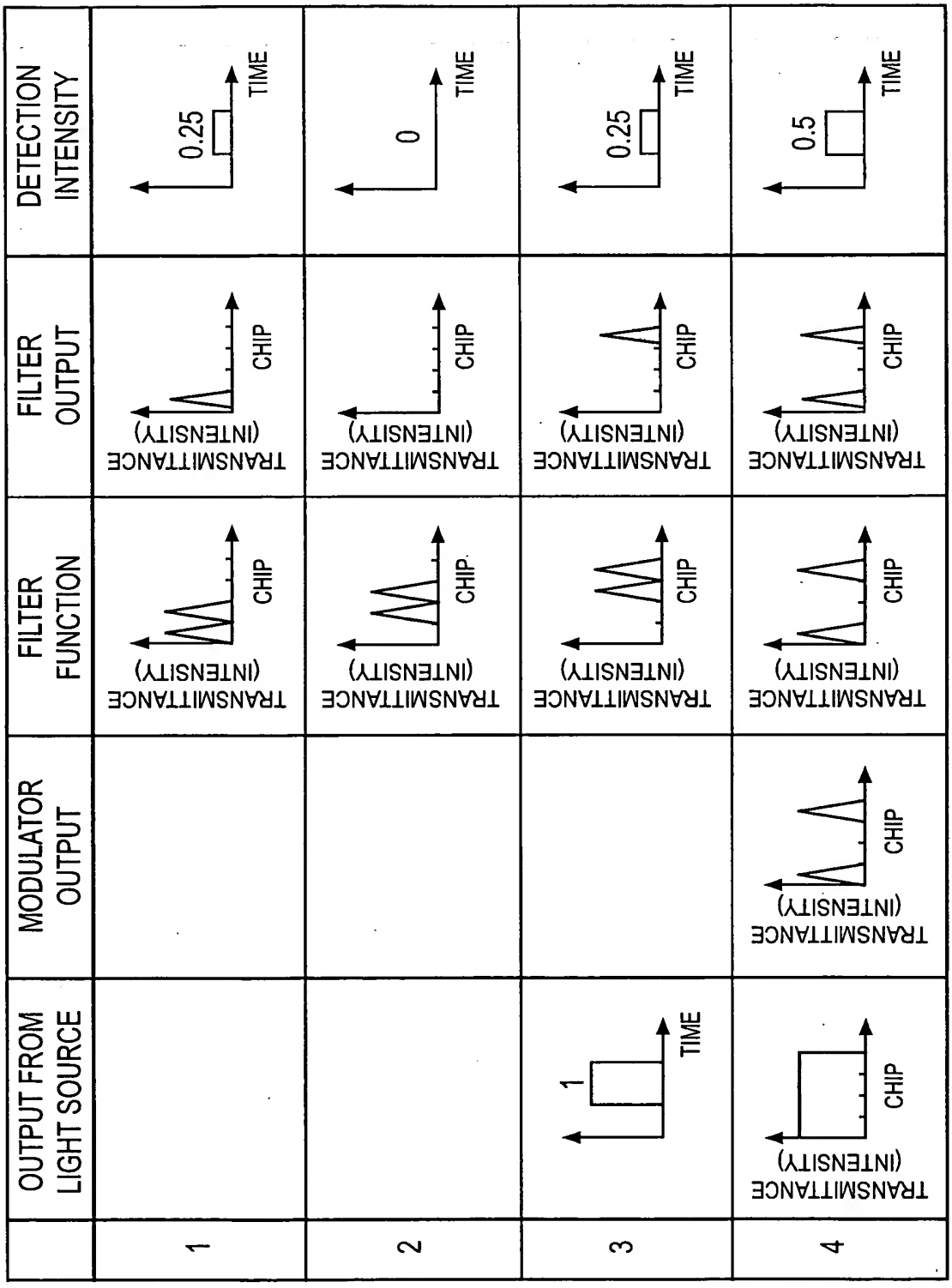

DETECTION INTENSITY
FILTER OUTPUT
FILTER FUNCTION
MODULATOR OUTPUT
OUTPUT FROM LIGHT SOURCE
1
2
3
4
0.25
TIME
0
TIME
0.25
TIME
0.5
TIME
TRANSMITTANCE (INTENSITY)
CHIP
1
TIME

FIG. 42-4

FIG. 43(a)

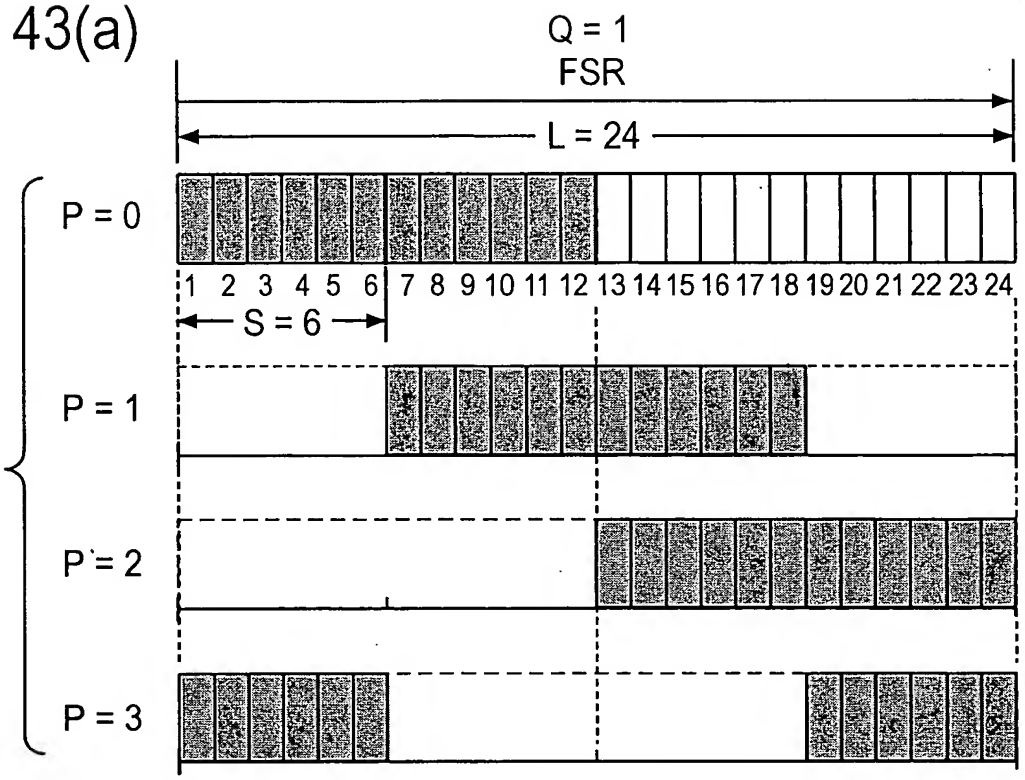
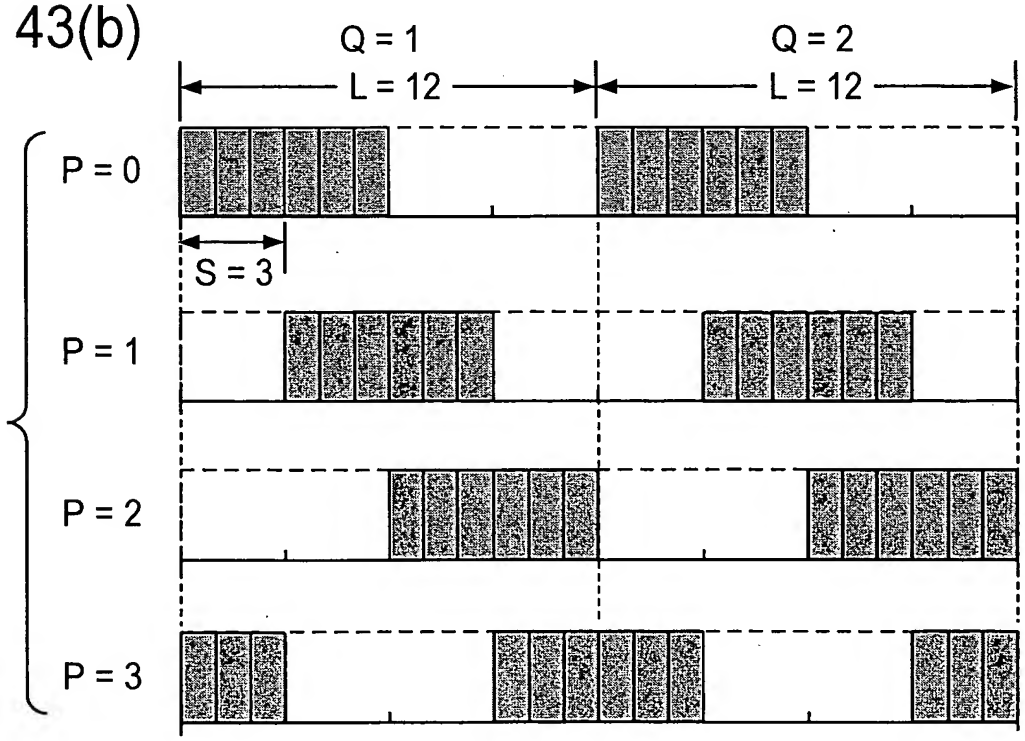


FIG. 43(b)



n=1, M=2, S=8, L=24

n=2, M=3, S=4, L=12

FIG. 44(a)

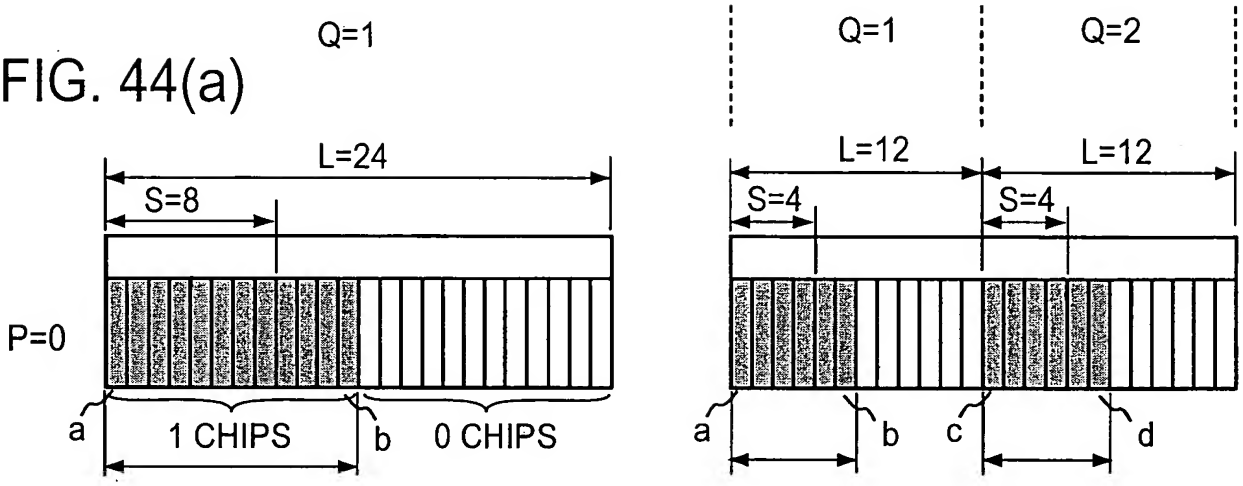


FIG. 44(b)

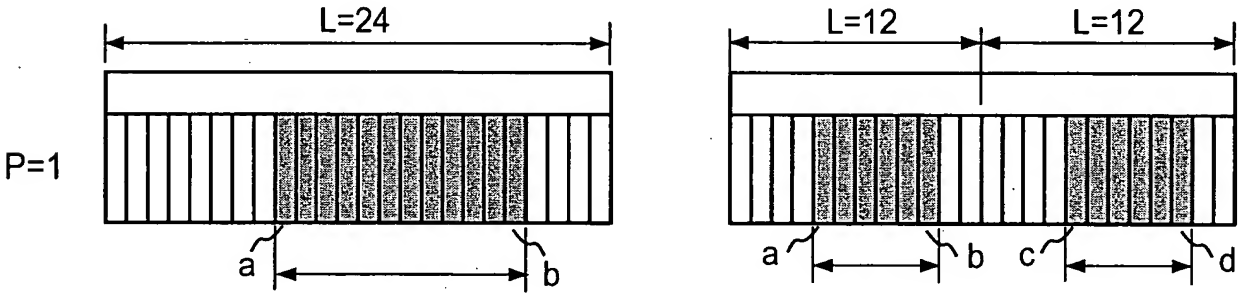
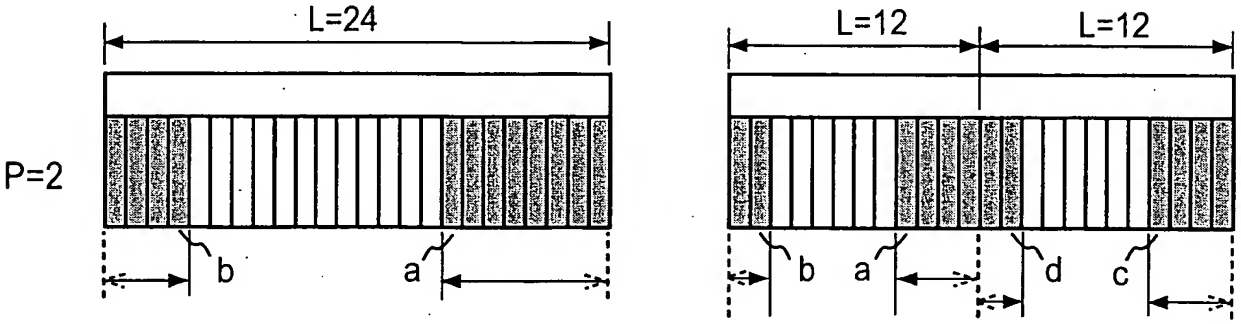


FIG. 44(c)



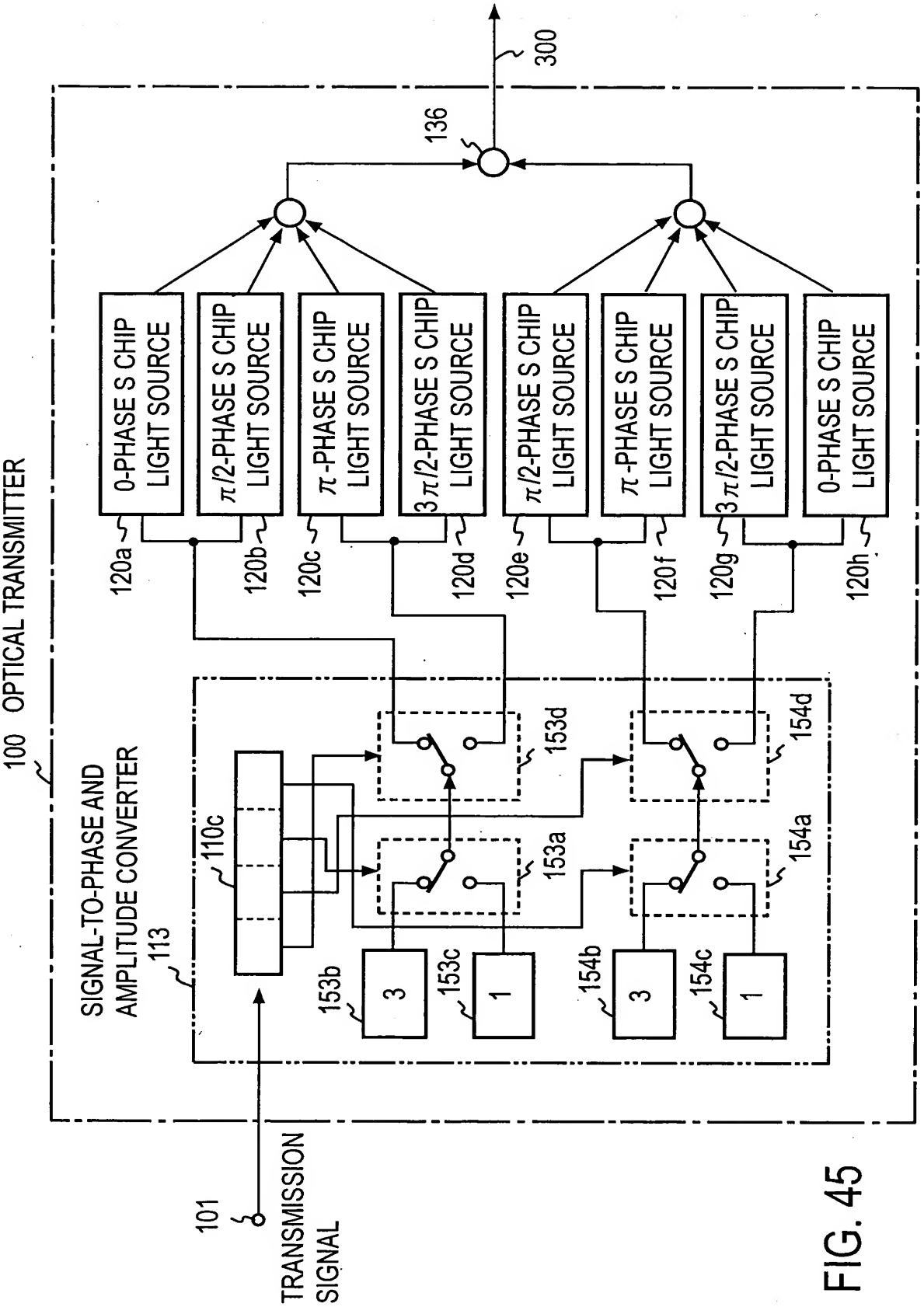

100 OPTICAL TRANSMITTER
300
136
0-PHASE S CHIP LIGHT SOURCE
π/2-PHASE S CHIP LIGHT SOURCE
π-PHASE S CHIP LIGHT SOURCE
3π/2-PHASE S CHIP LIGHT SOURCE
π/2-PHASE S CHIP LIGHT SOURCE
π-PHASE S CHIP LIGHT SOURCE
3π/2-PHASE S CHIP LIGHT SOURCE
0-PHASE S CHIP LIGHT SOURCE
120a
120b
120c
120d
120e
120f
120g
120h
SIGNAL-TO-PHASE AND AMPLITUDE CONVERTER
113
110c
153a
153b
153c
153d
154a
154b
154c
154d
3
1
3
1
101
TRANSMISSION SIGNAL

FIG. 45

FIG. 46

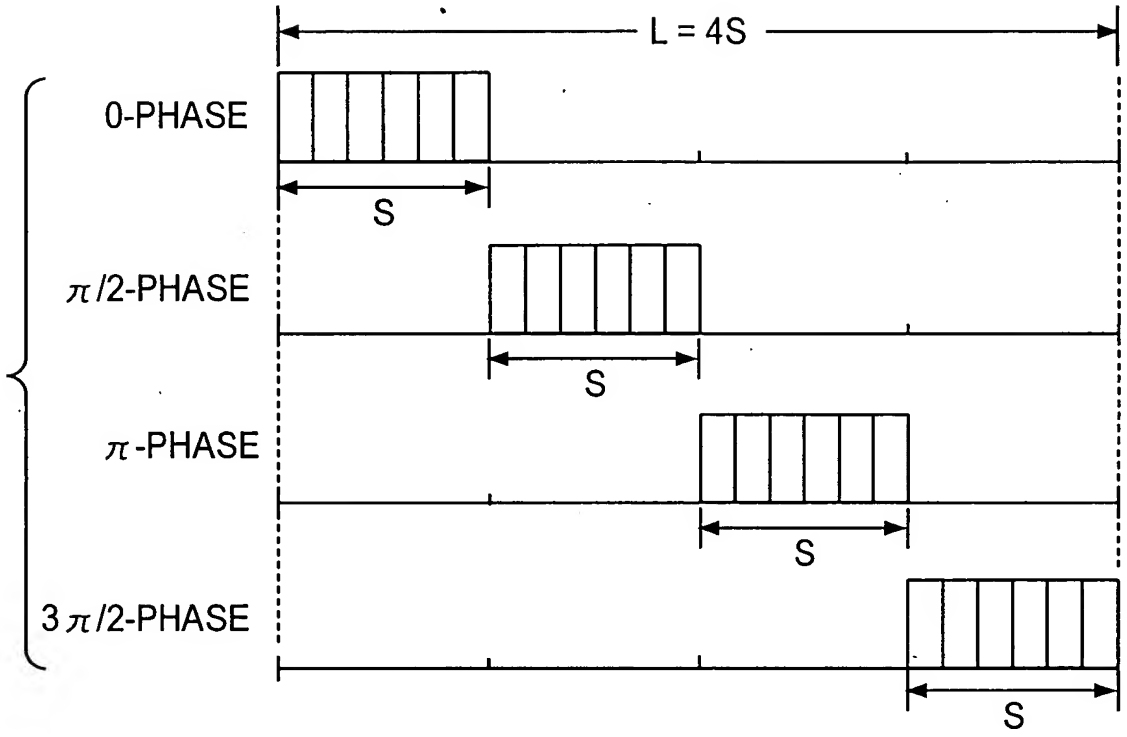
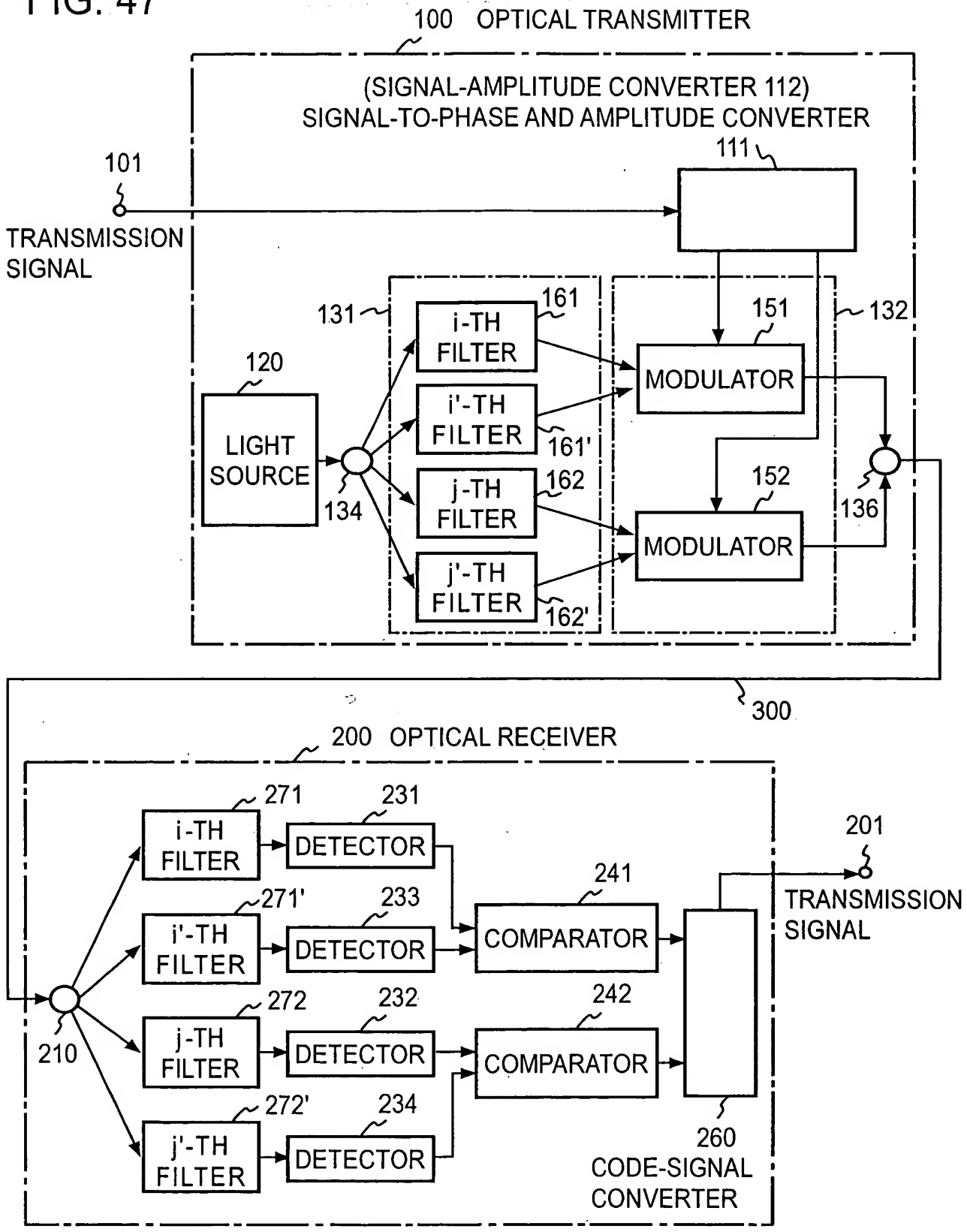


FIG. 47


100 OPTICAL TRANSMITTER
(SIGNAL-AMPLITUDE CONVERTER 112)
SIGNAL-TO-PHASE AND AMPLITUDE CONVERTER
111
101
TRANSMISSION SIGNAL
131
161
i-TH FILTER
i'-TH FILTER
161'
j-TH FILTER
162
j'-TH FILTER
162'
120
LIGHT SOURCE
134
151
MODULATOR
152
MODULATOR
132
136
300
200 OPTICAL RECEIVER
271
231
i-TH FILTER
DETECTOR
271'
233
i'-TH FILTER
DETECTOR
272
232
j-TH FILTER
DETECTOR
272'
234
j'-TH FILTER
DETECTOR
210
241
COMPARATOR
242
COMPARATOR
201
TRANSMISSION SIGNAL
260
CODE-SIGNAL CONVERTER

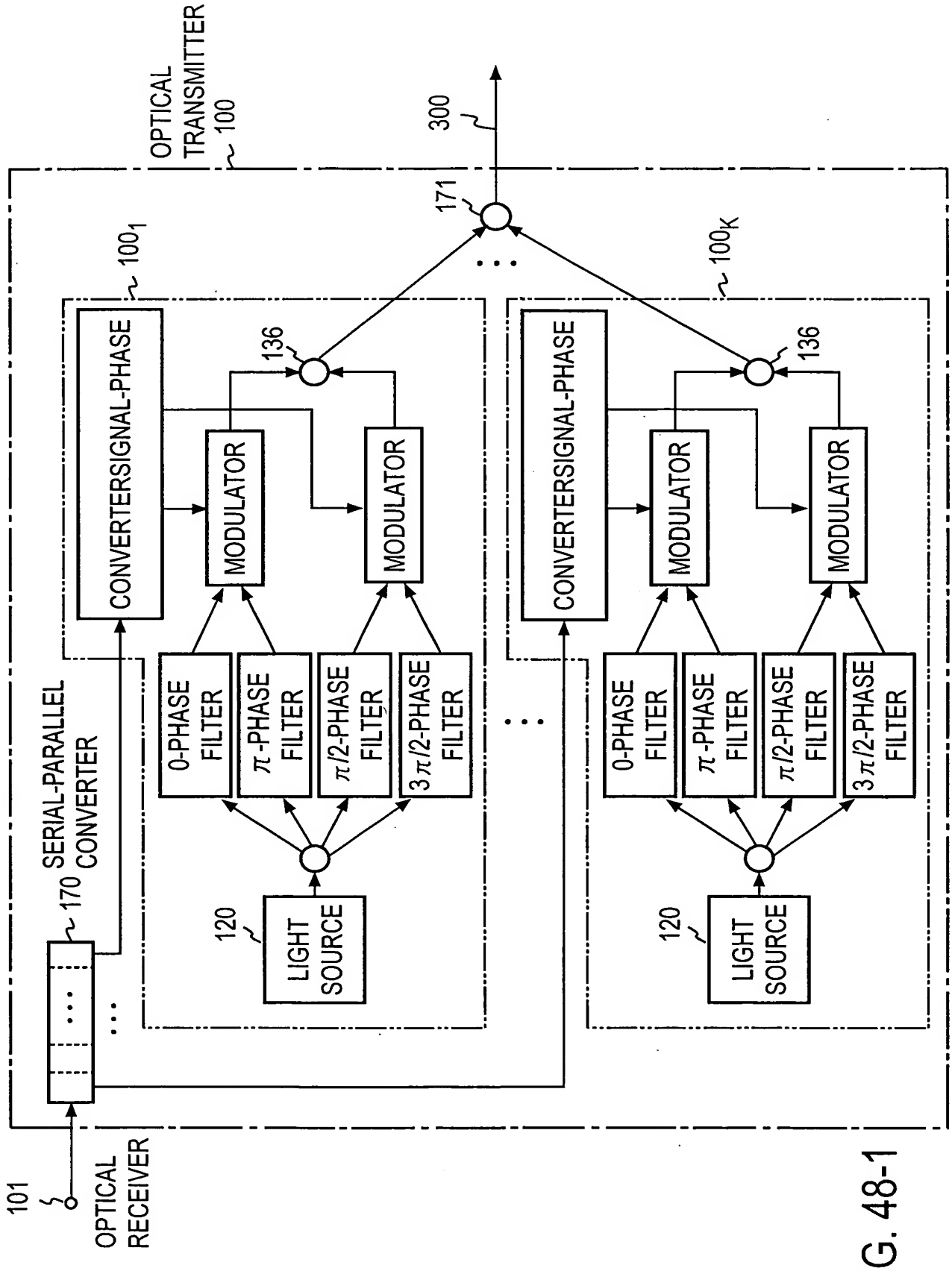

OPTICAL TRANSMITTER
100
300
171
100_1
100_K
CONVERTER
SIGNAL-PHASE
136
MODULATOR
MODULATOR
0-PHASE FILTER
π-PHASE FILTER
$\pi/2$-PHASE FILTER
$3\pi/2$-PHASE FILTER
120
LIGHT SOURCE
SERIAL-PARALLEL CONVERTER
170
101
OPTICAL RECEIVER

FIG. 48-1

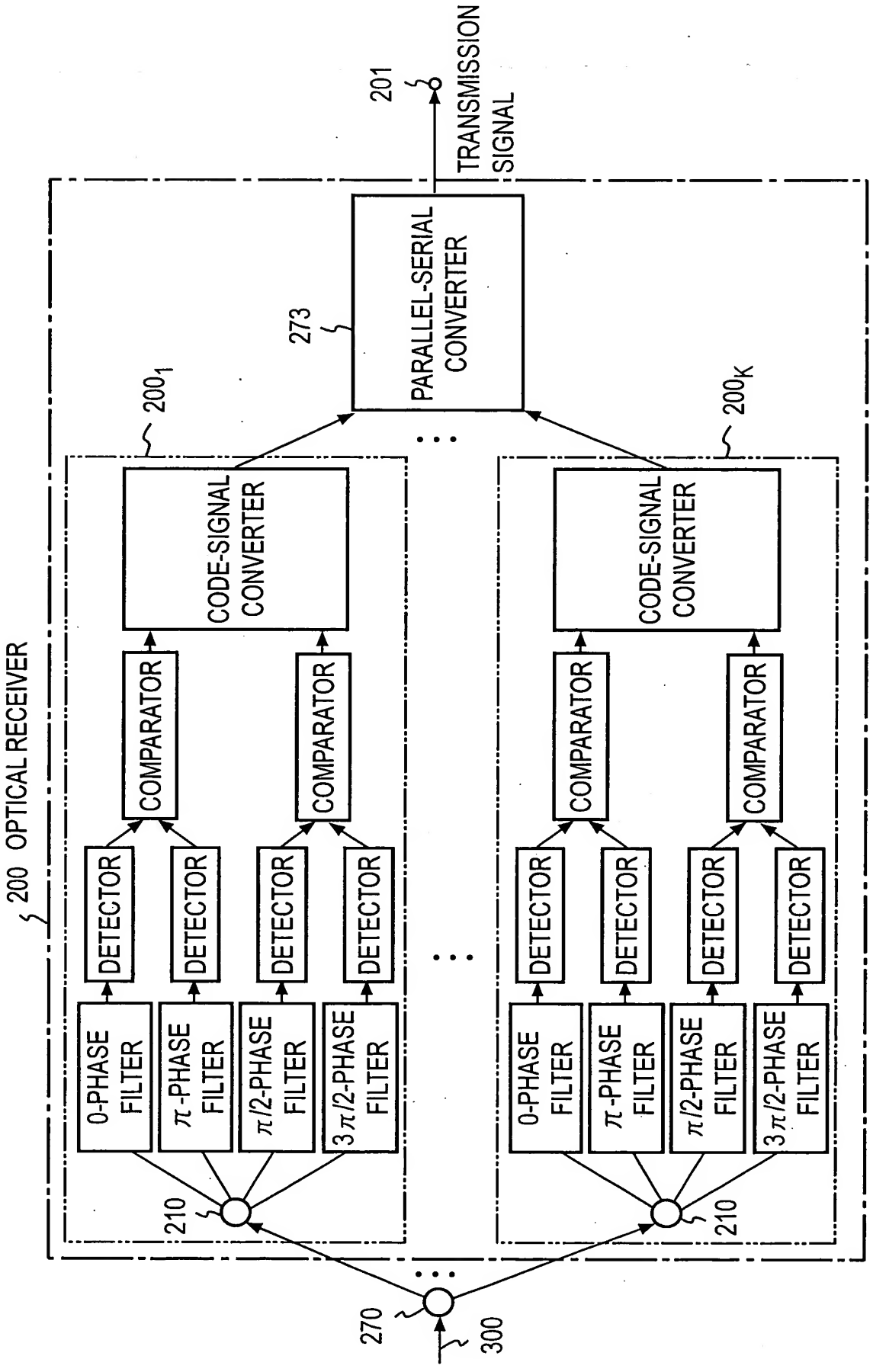

200 OPTICAL RECEIVER
200_1
200_K
201
TRANSMISSION SIGNAL
273
PARALLEL-SERIAL CONVERTER
CODE-SIGNAL CONVERTER
COMPARATOR
DETECTOR
0-PHASE FILTER
π-PHASE FILTER
$\pi/2$-PHASE FILTER
$3\pi/2$-PHASE FILTER
210
270
300

FIG. 48-2

FIG. 49

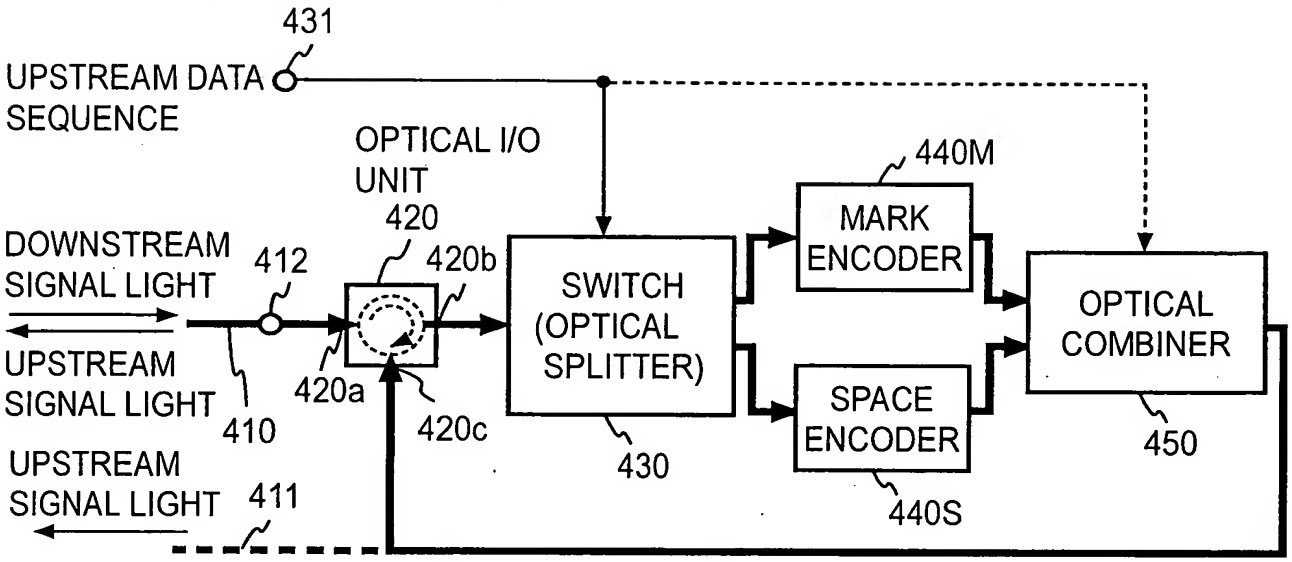


FIG. 50(a)

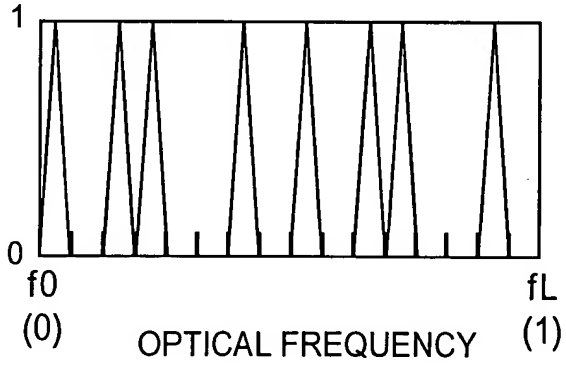


FIG. 50(b)

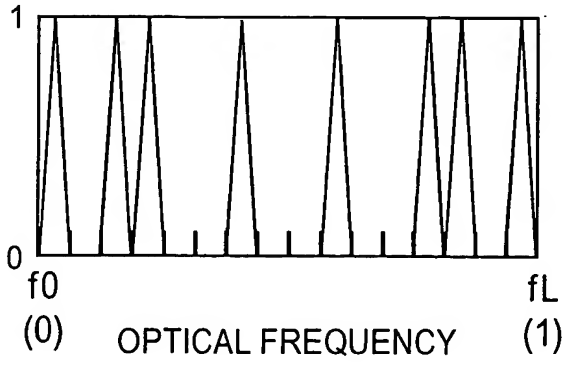


FIG. 51

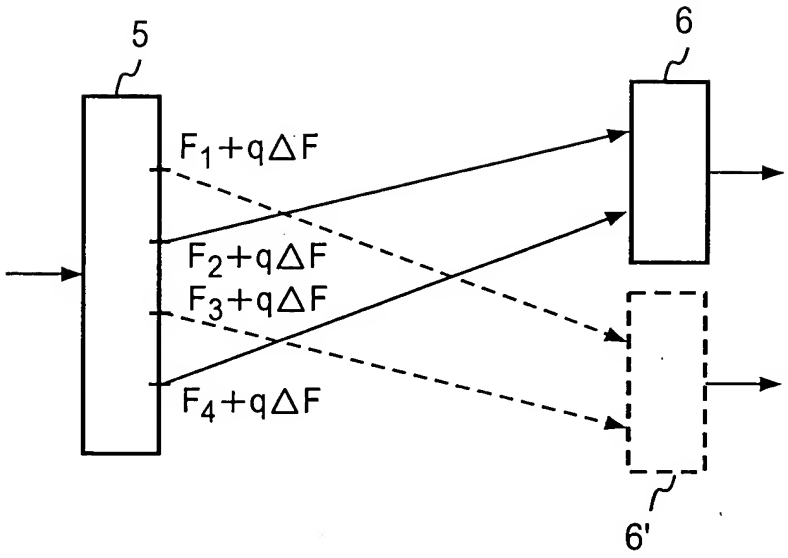
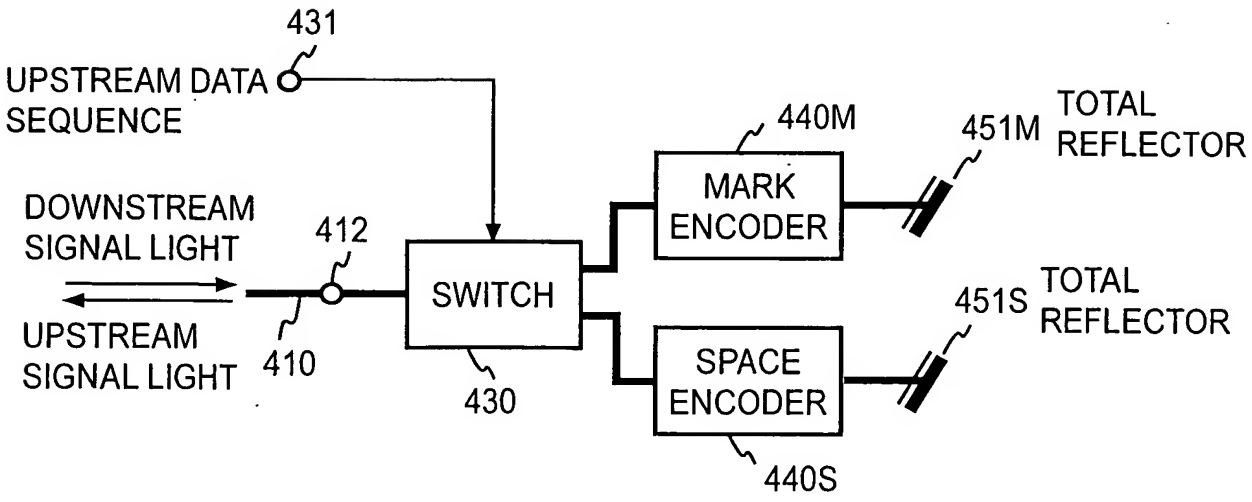

5
6
$F_1+q\Delta F$
$F_2+q\Delta F$
$F_3+q\Delta F$
$F_4+q\Delta F$
6'

FIG. 52


431
UPSTREAM DATA SEQUENCE
DOWNSTREAM SIGNAL LIGHT
UPSTREAM SIGNAL LIGHT
412
410
SWITCH
430
440M
MARK ENCODER
451M
TOTAL REFLECTOR
451S
TOTAL REFLECTOR
SPACE ENCODER
440S

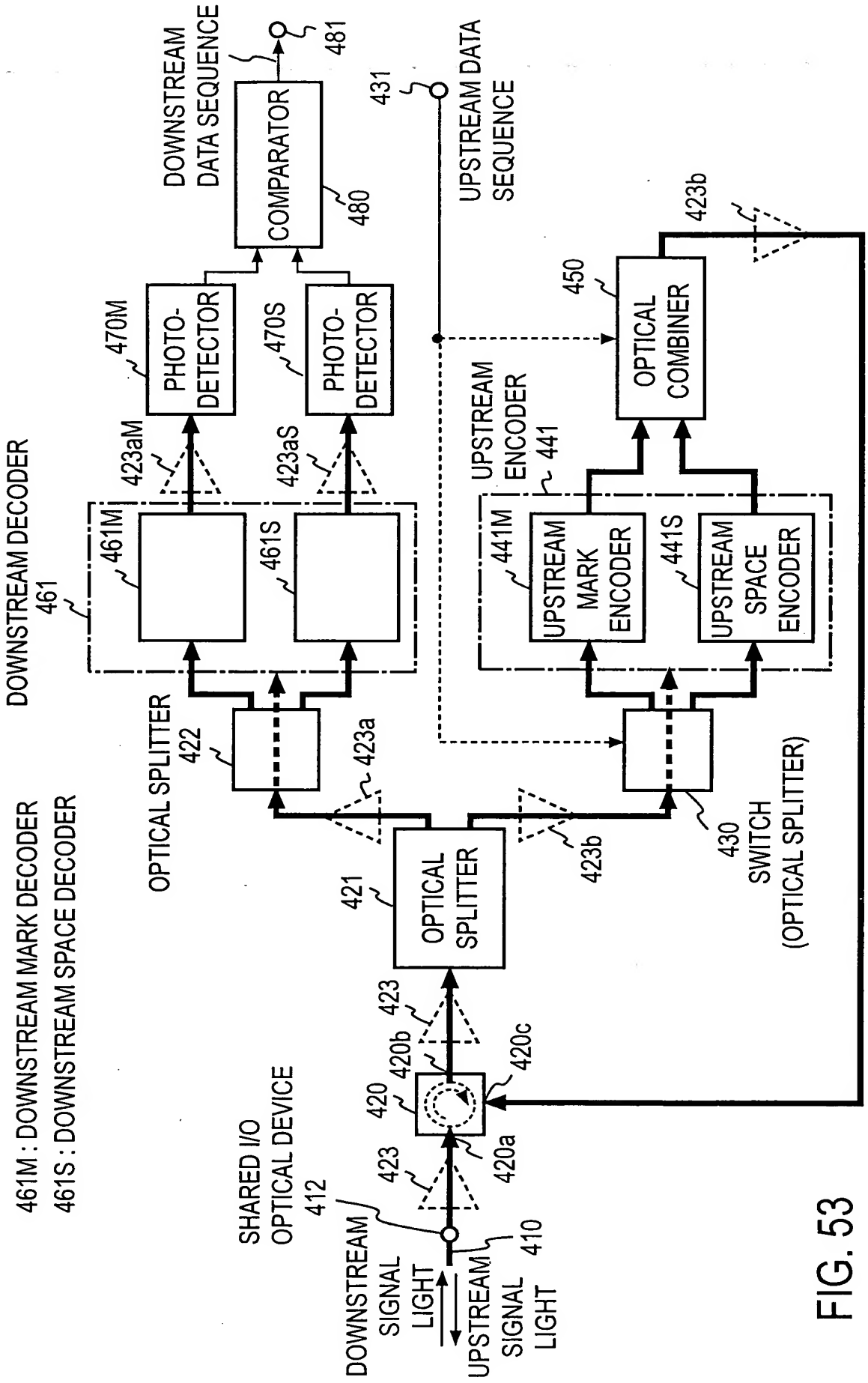

461M : DOWNSTREAM MARK DECODER
461S : DOWNSTREAM SPACE DECODER
DOWNSTREAM DECODER
461
461M
461S
423aM
423aS
470M
470S
PHOTO-DETECTOR
PHOTO-DETECTOR
COMPARATOR
480
481
DOWNSTREAM DATA SEQUENCE
431
UPSTREAM DATA SEQUENCE
OPTICAL SPLITTER
422
423a
UPSTREAM ENCODER
441
441M
441S
UPSTREAM MARK ENCODER
UPSTREAM SPACE ENCODER
450
OPTICAL COMBINER
423b
421
OPTICAL SPLITTER
423b
430
SWITCH
(OPTICAL SPLITTER)
SHARED I/O OPTICAL DEVICE
412
423
420b
420
420a
420c
DOWNSTREAM SIGNAL LIGHT
UPSTREAM SIGNAL LIGHT
410

FIG. 53

FIG. 54(a)

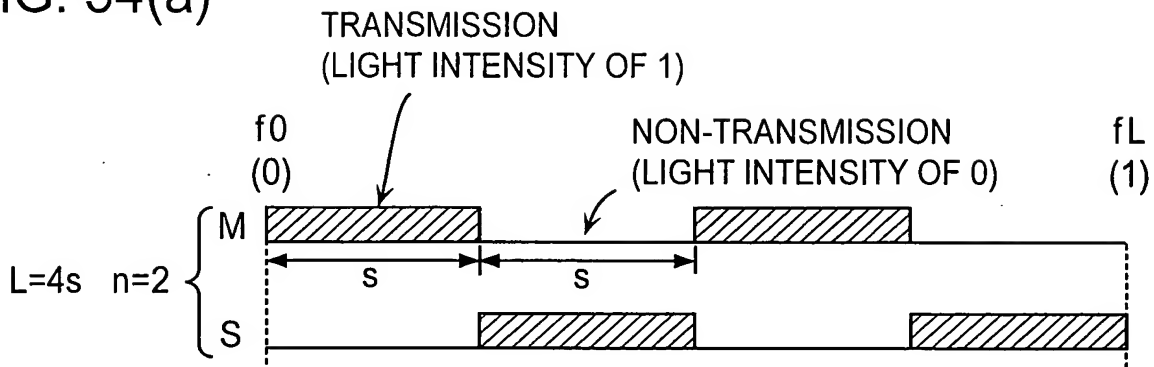


FIG. 54(b)

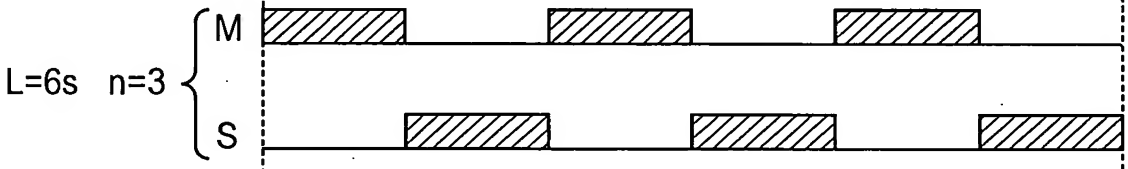
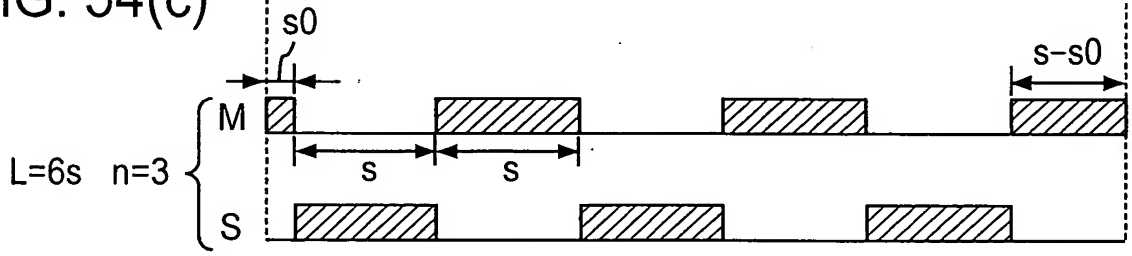


FIG. 54(c)



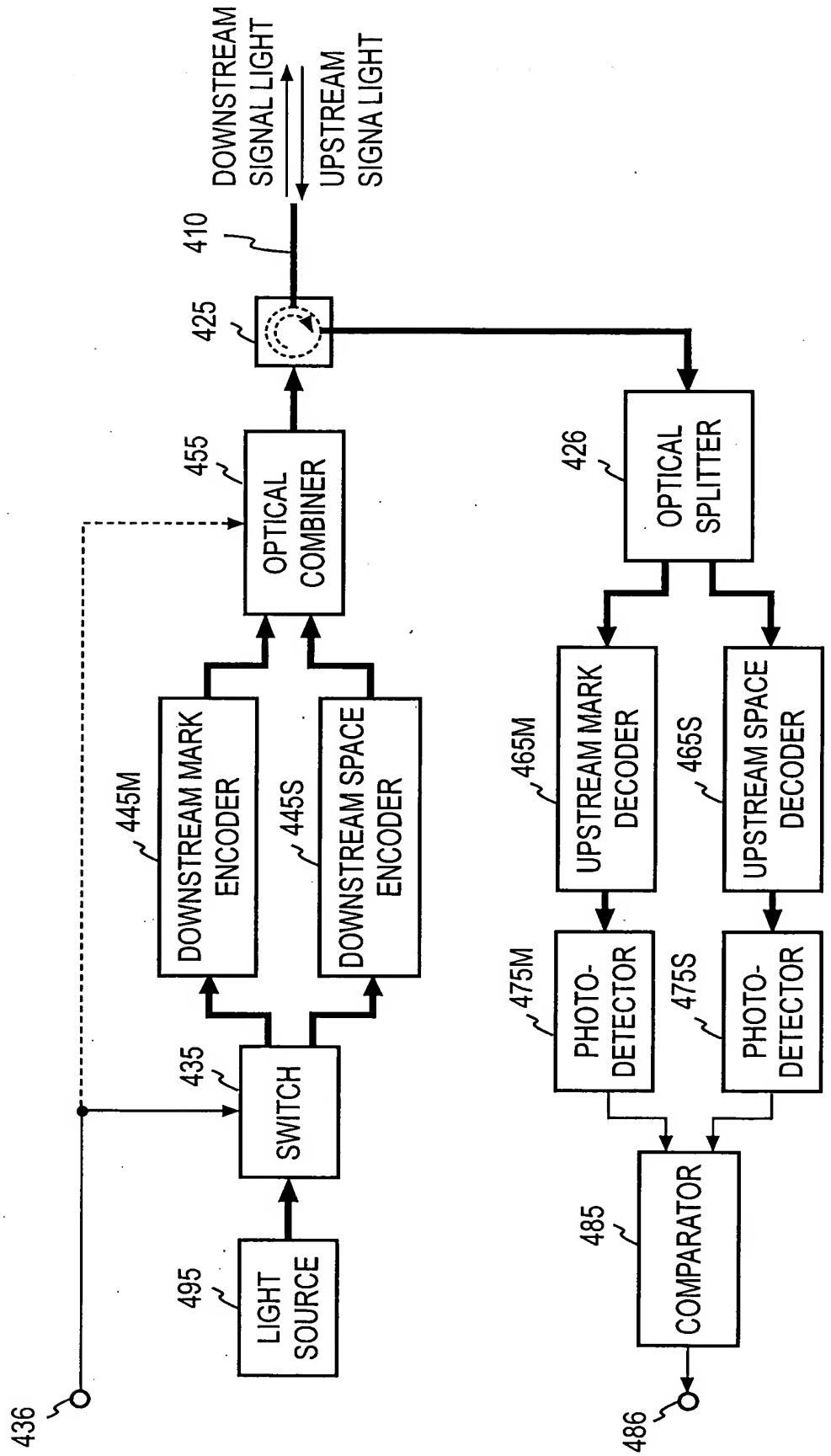

DOWNSTREAM SIGNAL LIGHT
UPSTREAM SIGNA LIGHT
410
425
455
OPTICAL COMBINER
426
OPTICAL SPLITTER
445M
DOWNSTREAM MARK ENCODER
445S
DOWNSTREAM SPACE ENCODER
465M
UPSTREAM MARK DECODER
465S
UPSTREAM SPACE DECODER
435
SWITCH
475M
PHOTO-DETECTOR
475S
PHOTO-DETECTOR
495
LIGHT SOURCE
485
COMPARATOR
436
486

FIG. 55

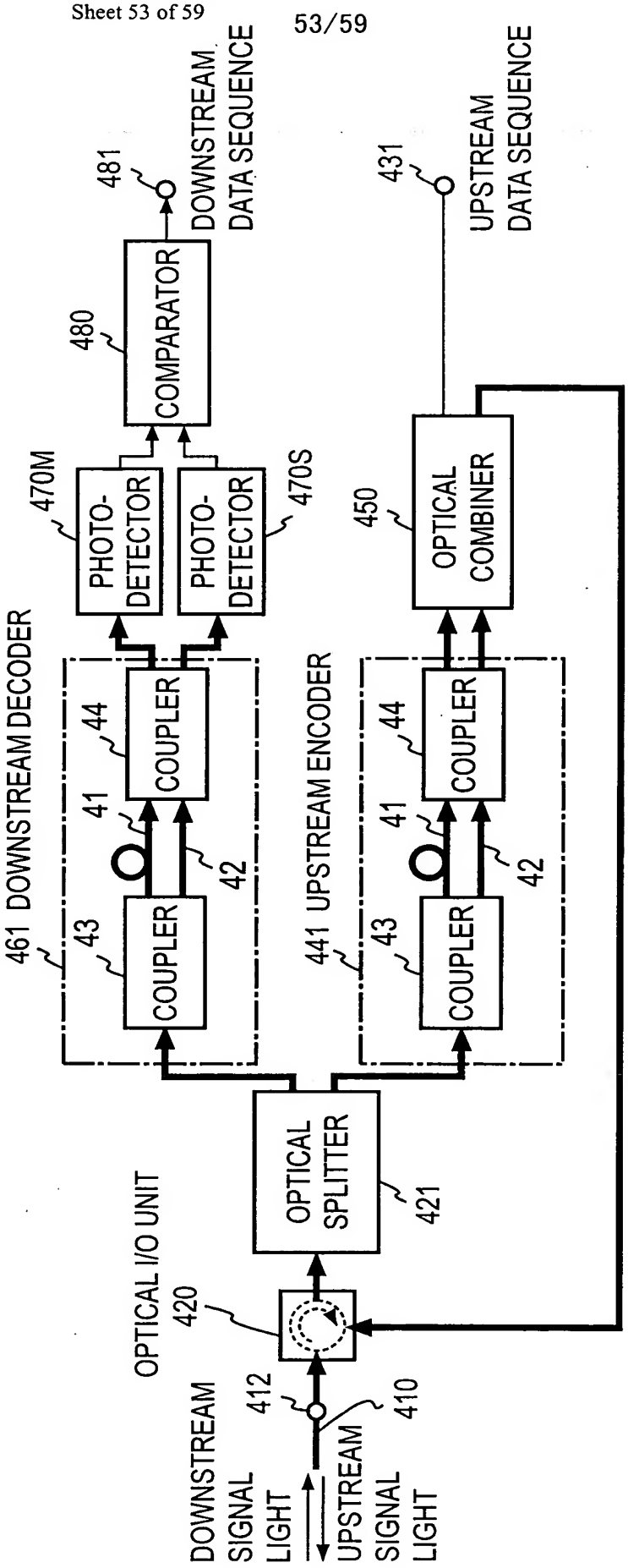
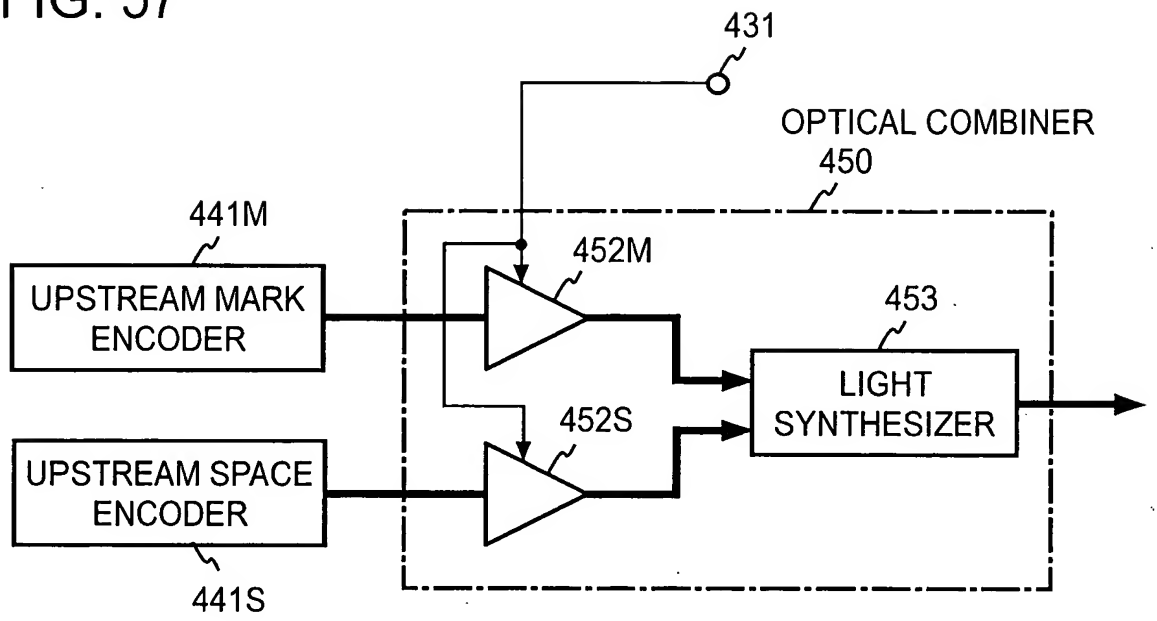

DOWNSTREAM SIGNAL LIGHT
UPSTREAM SIGNAL LIGHT
OPTICAL I/O UNIT
420
412
410
OPTICAL SPLITTER
421
461 DOWNSTREAM DECODER
441 UPSTREAM ENCODER
COUPLER
43
41
42
44
COUPLER
PHOTO-DETECTOR
470M
PHOTO-DETECTOR
470S
COMPARATOR
480
481
DOWNSTREAM DATA SEQUENCE
OPTICAL COMBINER
450
431
UPSTREAM DATA SEQUENCE

FIG. 56

FIG. 57


431
OPTICAL COMBINER
450
441M
452M
453
UPSTREAM MARK ENCODER
LIGHT SYNTHESIZER
452S
UPSTREAM SPACE ENCODER
441S

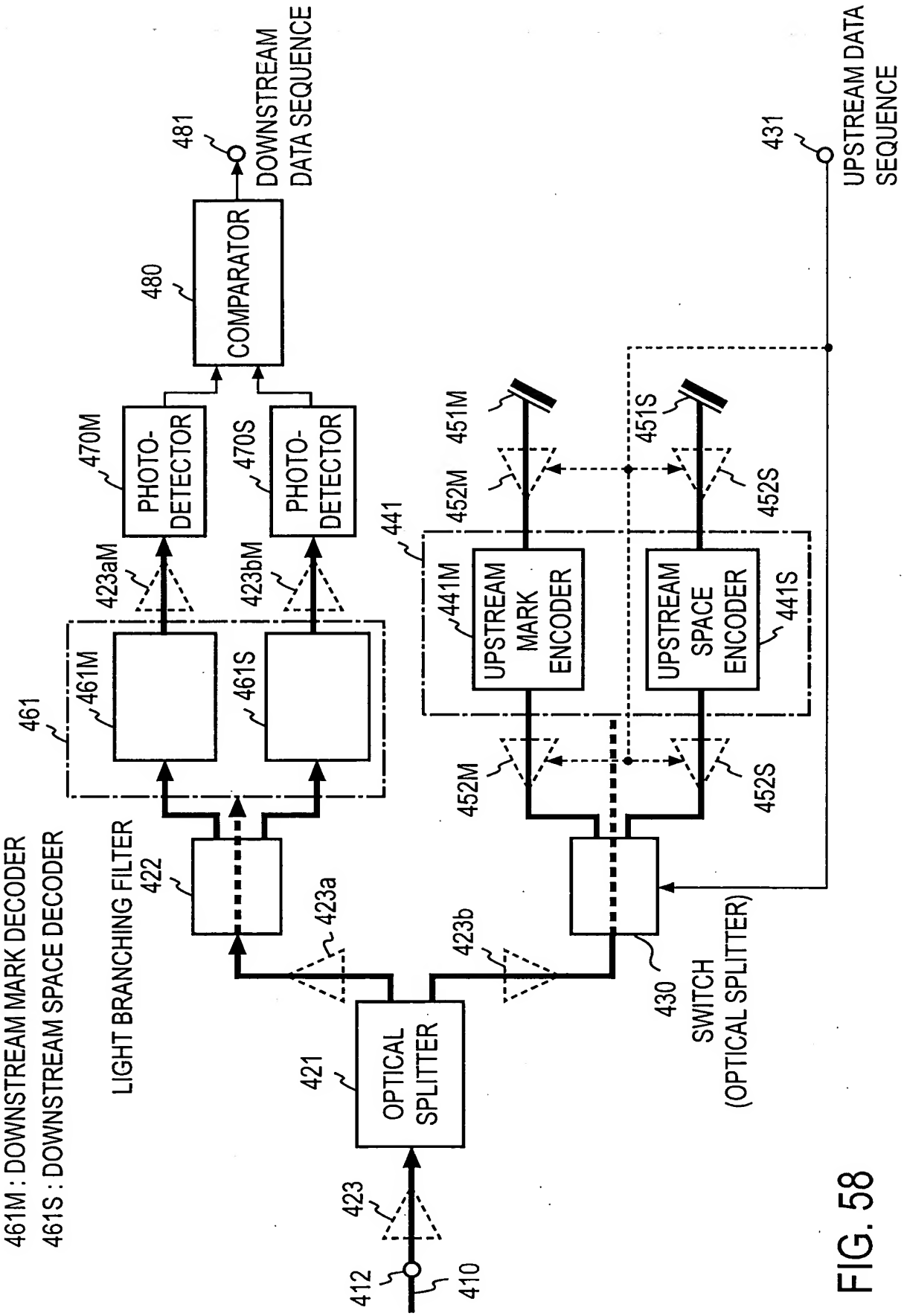

461M : DOWNSTREAM MARK DECODER
461S : DOWNSTREAM SPACE DECODER
LIGHT BRANCHING FILTER
422
423a
423b
421
OPTICAL SPLITTER
423
412
410
461
461M
461S
423aM
423bM
470M
470S
PHOTO-DETECTOR
PHOTO-DETECTOR
480
COMPARATOR
481
DOWNSTREAM DATA SEQUENCE
441
441M
UPSTREAM MARK ENCODER
441S
UPSTREAM SPACE ENCODER
451M
451S
452M
452S
452M
452S
430
SWITCH (OPTICAL SPLITTER)
431
UPSTREAM DATA SEQUENCE

FIG. 58

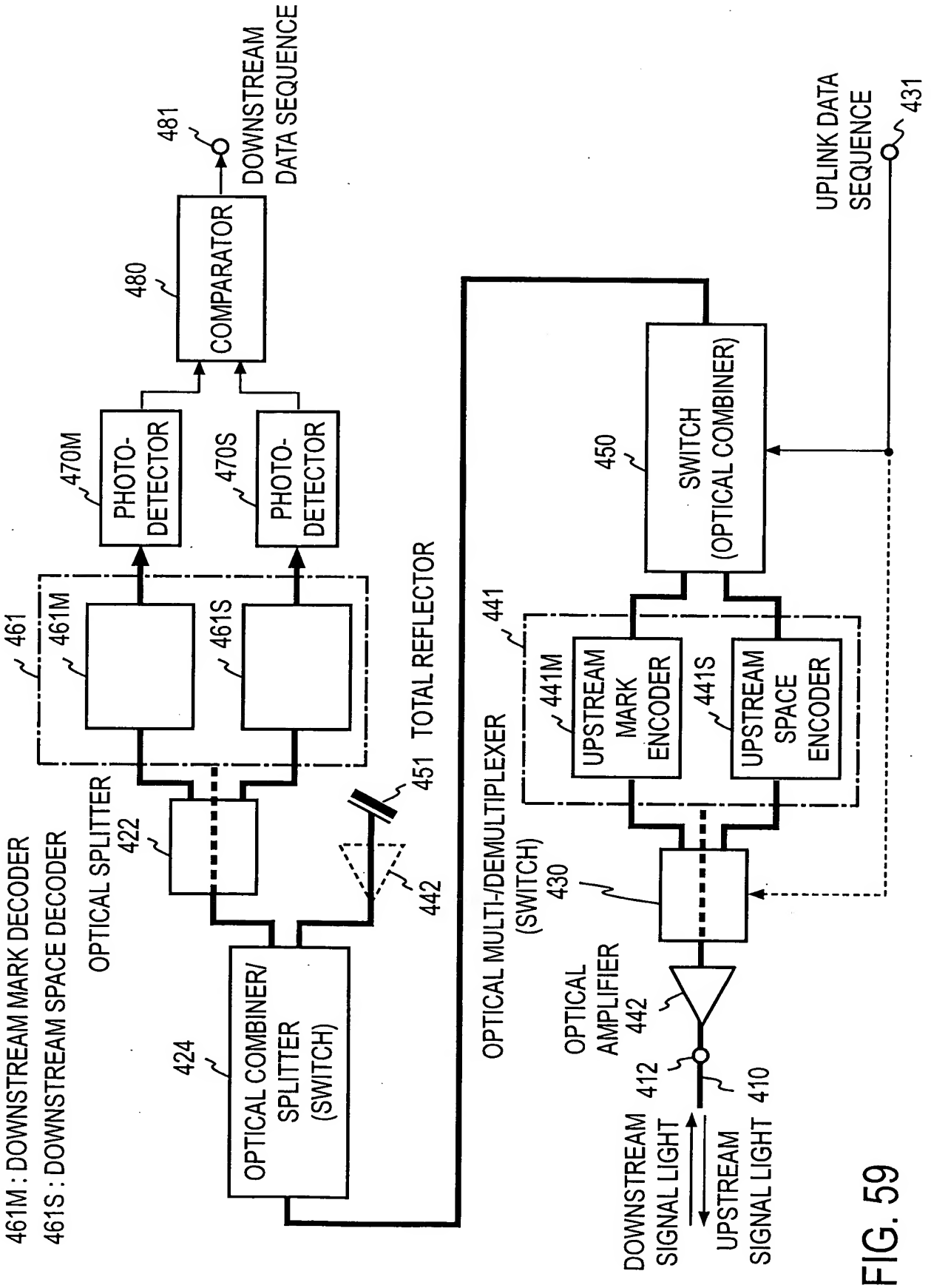

461M : DOWNSTREAM MARK DECODER
461S : DOWNSTREAM SPACE DECODER
OPTICAL SPLITTER
422
461
461M
461S
424
OPTICAL COMBINER/ SPLITTER (SWITCH)
451 TOTAL REFLECTOR
442
470M
PHOTO-DETECTOR
470S
PHOTO-DETECTOR
480
COMPARATOR
481
DOWNSTREAM DATA SEQUENCE
OPTICAL MULTI-/DEMULTIPLEXER (SWITCH)
430
441
441M
UPSTREAM MARK ENCODER
441S
UPSTREAM SPACE ENCODER
450
SWITCH (OPTICAL COMBINER)
UPLINK DATA SEQUENCE
431
OPTICAL AMPLIFIER
442
412
410
DOWNSTREAM SIGNAL LIGHT
UPSTREAM SIGNAL LIGHT

FIG. 59

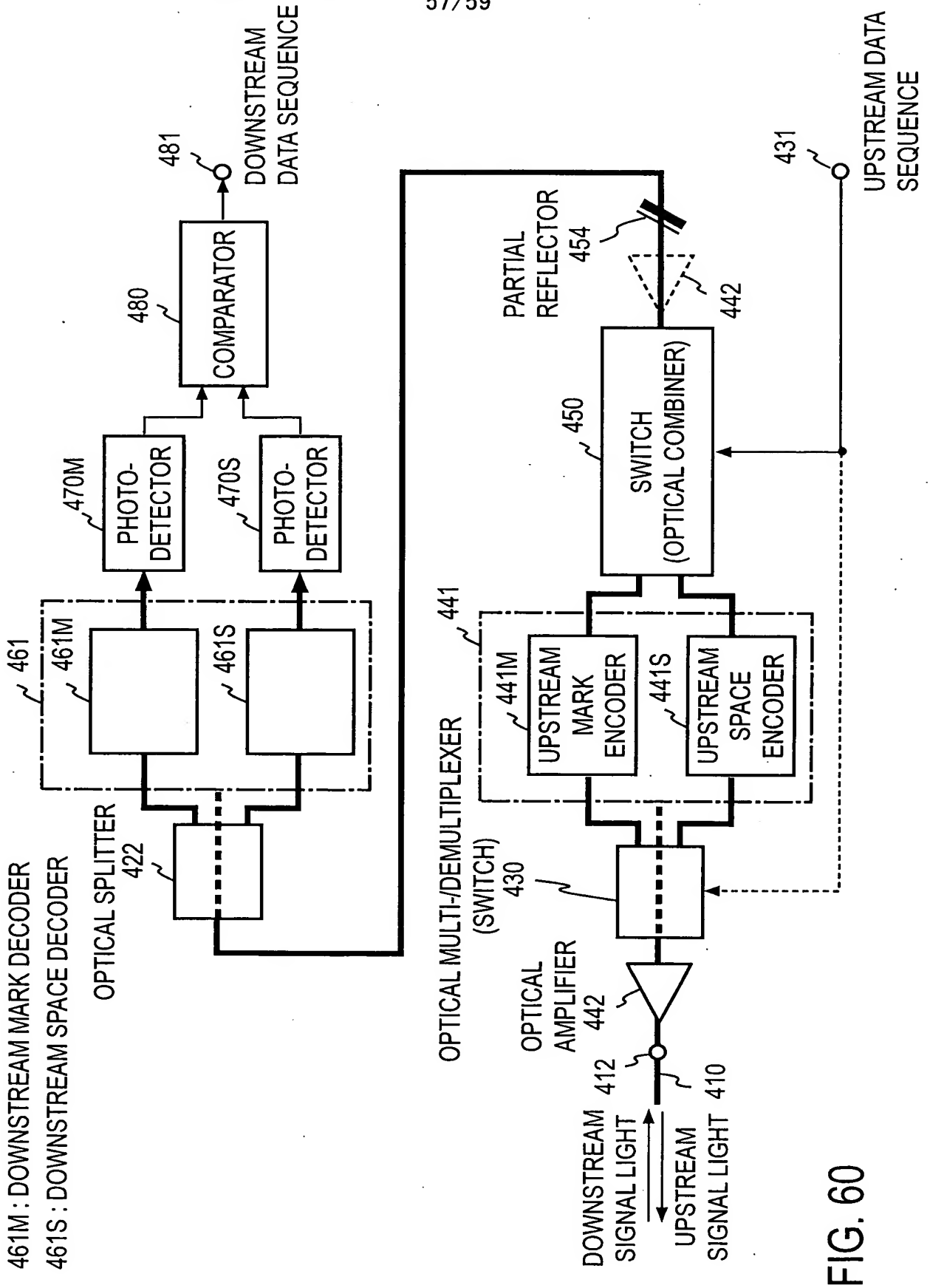

461M : DOWNSTREAM MARK DECODER
461S : DOWNSTREAM SPACE DECODER
OPTICAL SPLITTER 422
461
461M
461S
470M
PHOTO-DETECTOR
470S
PHOTO-DETECTOR
480
COMPARATOR
481
DOWNSTREAM DATA SEQUENCE
OPTICAL MULTI-/DEMULTIPLEXER (SWITCH) 430
441
441M
UPSTREAM MARK ENCODER
441S
UPSTREAM SPACE ENCODER
450
SWITCH (OPTICAL COMBINER)
PARTIAL REFLECTOR 454
442
431
UPSTREAM DATA SEQUENCE
OPTICAL AMPLIFIER 442
412
410
DOWNSTREAM SIGNAL LIGHT
UPSTREAM SIGNAL LIGHT

FIG. 60

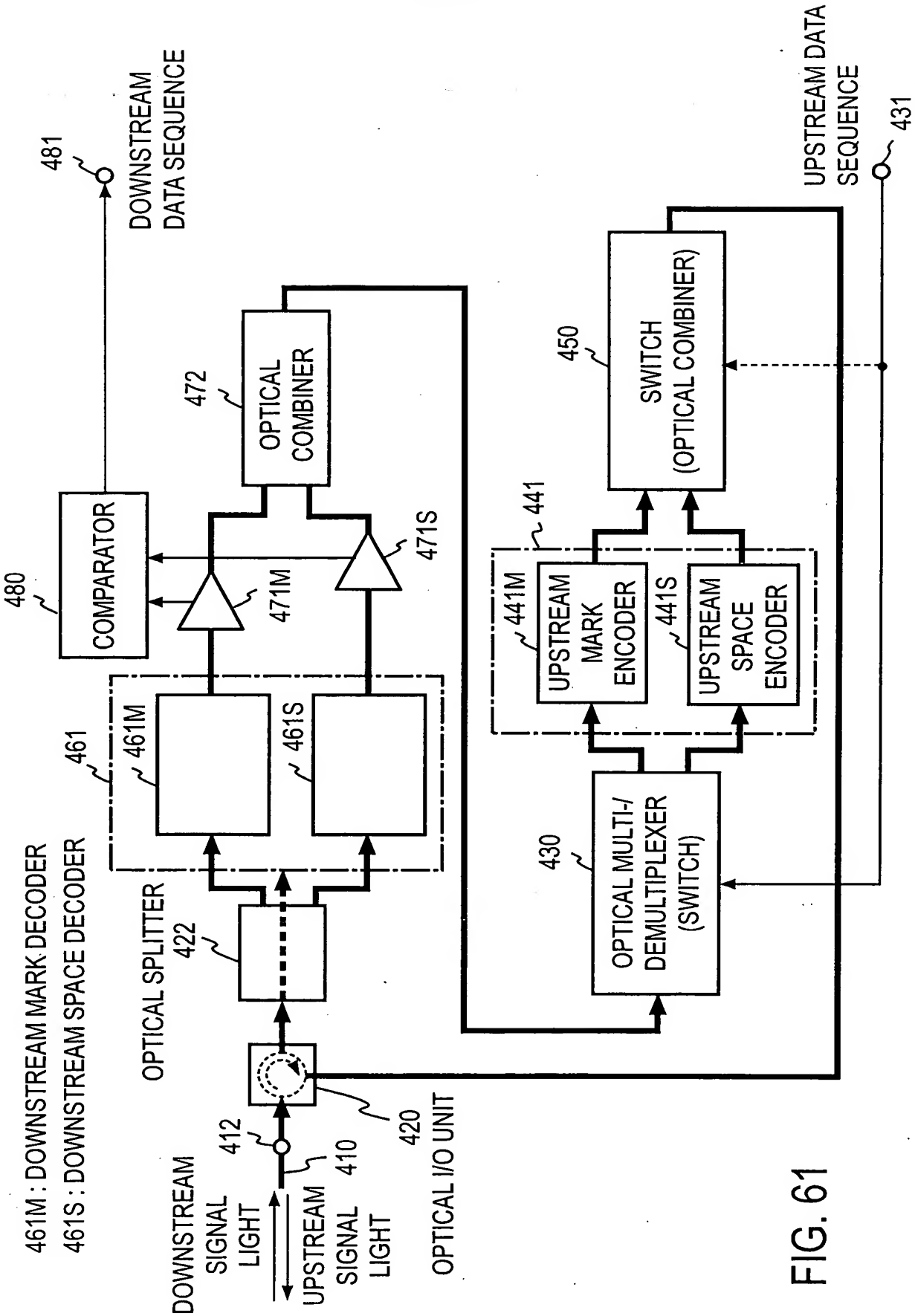

461M : DOWNSTREAM MARK DECODER
461S : DOWNSTREAM SPACE DECODER
DOWNSTREAM SIGNAL LIGHT
UPSTREAM SIGNAL LIGHT
412
410
420
OPTICAL I/O UNIT
OPTICAL SPLITTER
422
461
461M
461S
480
COMPARATOR
481
DOWNSTREAM DATA SEQUENCE
472
OPTICAL COMBINER
471M
471S
441
441M
UPSTREAM MARK ENCODER
441S
UPSTREAM SPACE ENCODER
430
OPTICAL MULTI-/ DEMULTIPLEXER (SWITCH)
450
SWITCH (OPTICAL COMBINER)
UPSTREAM DATA SEQUENCE
431

FIG. 61

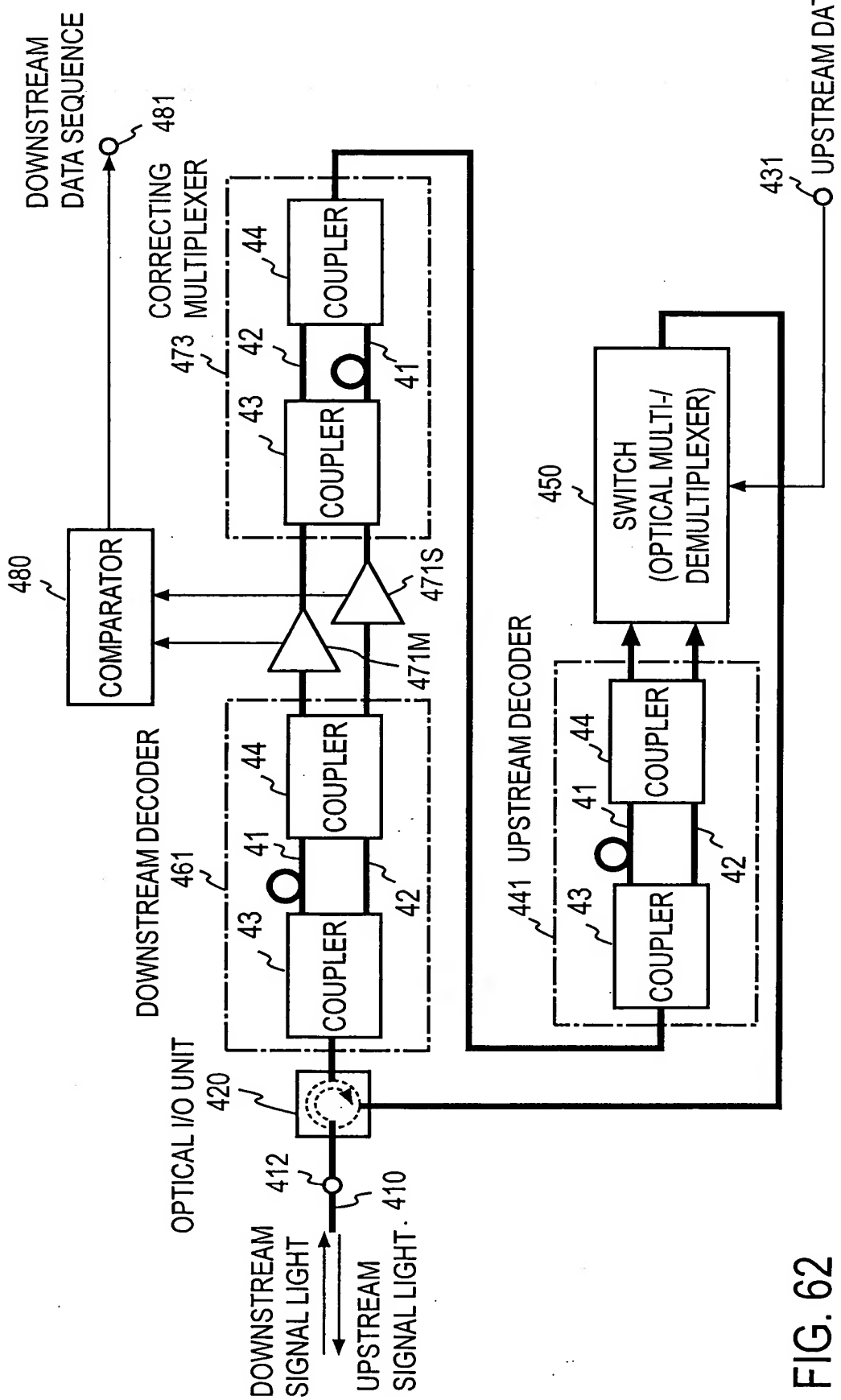

DOWNSTREAM DATA SEQUENCE
481
CORRECTING MULTIPLEXER
473
COUPLER
44
42
41
43
480
COMPARATOR
471S
471M
DOWNSTREAM DECODER
461
OPTICAL I/O UNIT
420
412
410
DOWNSTREAM SIGNAL LIGHT
UPSTREAM SIGNAL LIGHT
441 UPSTREAM DECODER
450
SWITCH (OPTICAL MULTI-/ DEMULTIPLEXER)
431
UPSTREAM DATA SEQUENCE

FIG. 62